DRAFT

RISK-BASED END STATE VISION

Fernald Closure Project
December 1, 2003

EXECUTIVE SUMMARY

This document provides a description of the Risk-Based End State (RBES) Vision for the U.S. Department of Energy (DOE) Fernald Closure Project (FCP). The purpose of the RBES document is to effectively communicate the RBES Vision of the FCP site to Regulators, DOE Headquarters (HQ), and Stakeholders.

DOE Policy 455.1, **Use of Risk-Based End States**, was issued in July 2003 as a follow-up to DOE's 2002 Top-to-Bottom Review**.** The intent of the policy is to ensure that DOE's nationwide cleanup effort is driven by clearly defined, risk-based end states, particularly for those sites that do not yet have cleanup agreements in place.

The DOE guidance document, *Guidance for Developing a Risk-Based, Site-Specific End State Vision,* was also released in July 2003 and finalized in September. The FCP has prepared this document as a deliverable in accordance with the guidance. The guidance addresses both the sites that have formal cleanup plans already in place (like Fernald), as well as those sites that do not yet have formal agency-approved Records of Decision.

Briefly, the guidance calls for each site's Vision to initially include ***all*** technically supportable, risk-based opportunities for consideration. From there, a short-listing of opportunities for further consideration is to be formulated. Note that Fernald is currently at the initial stage of risk-based opportunity identification; therefore, no short-listing has yet been conducted.

For sites that have formal cleanup agreements in place, the initial Vision "brainstorming" is not to be limited by the constraints of the cleanup agreements. Rather, at this stage of the process, the brainstorming of ideas is to consider all technically supportable possibilities, regardless of current agreement requirements.

The short-listing process will then include consideration of the existing cleanup agreements, and the potential need for (and benefit of) modifications to existing agreements. Again, this short-listing is to be done as a second step in full consultation with Stakeholders and Regulators. Note that in order to accommodate current agreement requirements, the guidance calls for the identification of "Variances" between current agreements and the RBES Vision. These Variances will then be considered during interactions with Regulators and Stakeholders, to arrive at the shortlist of implementable ideas that can then be finalized through necessary formal modifications to current agreements.

In its response to the Assistant Secretary for Environmental Management's (EM) Top-to-Bottom Review, the Fernald team outlined an aggressive approach to satisfying each of the four major recommendations carried forward from the review. Fernald's response reaffirmed the team's strategy and execution approach to achieve accelerated site closure in 2006, and outlined the needed support from DOE-HQ and Congress to achieve the 2006 objective. The aggressive acceleration actions contained in the Fernald team's response have been carried forward to the Performance Management Plan (PMP).

Prior to the development of initiatives in response to the Top-to-Bottom Review, Fernald's Performance Measurement Baseline called for closure in 2009. Fernald is implementing reform initiatives that reduce project risk and achieve closure three years earlier in 2006. Acceleration of closure carries the obvious benefit of earlier reduction of risk associated with Fernald contamination.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial investigations and feasibility studies have been completed for each of the operable units (OUs), and final

Records of Decision (RODs) to establish cleanup levels and document the cleanup remedies have been signed for each OU by DOE, U.S. Environmental Protection Agency (EPA), and Ohio EPA.

The projected final land use of the FCP site is an Undeveloped Park with limited public access to the site. Risk evaluations, conducted for each of the OUs of the FCP per EPA guidance, used the Undeveloped Park as the projected final use of the FCP. The Recreational User was the primary receptor used to establish cleanup levels at the site.

An Environmental Assessment (EA) was prepared in 1998 to finalize the land use decision for the FCP. The EA proposed that more than 900 acres of the site be restored and dedicated as an Undeveloped Park. The EA also proposed a 23-acre portion of the FCP that may be considered for development to support community needs and restated the commitment of the approximately 75-acre area that would remain dedicated to the On-Site Disposal Facility (OSDF). Public review of the EA supported the proposed land use of the FCP and the land use decision was documented in a Finding of No Significant Impact (FONSI) issued in June 1999.

The future mission for Fernald will be Legacy Management of the areas of concern left on site. The decisions concerning the final list of hazards to be left on site, as well as the acceptability of a monitored natural attenuation strategy for the Great Miami Aquifer that is identified in the RBES Vision, will be evaluated collaboratively with the participation of the Fernald Citizen's Advisory Board (FCAB), EPA, and Ohio EPA. Both the FCAB and the Regulators have strongly pointed out that the risk-based decisions already reached for the site to arrive at the original cleanup remedies in the RODs have produced a solid "RBES Vision" for Fernald that requires little further tailoring. However, the participants expressed a willingness to consider a reasonable new end-state Vision as long as a clear benefit is shown and they are actively included in the up-front planning and decision-making, with sufficient time and information from which to arrive at acceptable solutions.

During October 2003, initial meetings were held with the FCAB and the Regulatory Agencies to identify issues of concern with the changes that may be contemplated under the RBES Vision. It was clear from the initial interactions that the FCAB and the Regulators are not amenable to changes in groundwater cleanup levels, surface water discharge limits, or other changes that significantly increase residual contamination following remediation, or releases during the process. The FCAB and agencies also raised concerns that the RBES process could create distractions and resource demands that ultimately detract from achieving the 2006 closure schedule if not managed wisely, considering the progress of remediation already being made in the field.

Provided Fernald's end state remains health and environmentally protective at levels consistent with the existing RODs, the participants are willing to consider new benefit-seeking initiatives through the RBES process that remain consistent with the 2006 schedule.

The FCP is a 2006 Accelerated Completion Site with an approved PMP. The RBES Guidance requires only the RBES associated maps, conceptual site models (CSM), and narratives; therefore, no current state information is provided in this document.

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ACRONYMS

AWWT	Advanced Wastewater Treatment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPRG	Cross-Media Preliminary Remediation Goals
CSM	Conceptual Site Models
D&D	decontamination and dismantlement
DOE	Department of Energy
EA	Environmental Assessment
EM	Environmental Management
EPA	Environmental Protection Agency
FCAB	Fernald Citizen's Advisory Board
FCP	Fernald Closure Project
FONSI	Finding of No Significant Impact
FRESH	Fernald Residents for Environment, Safety and Health
FRL	Final Remediation Level
HDPE	High-Density Polyethylene
HI	Hazard Index
HQ	Headquarters
ILCR	Incremental Lifetime Cancer Risk
MNA	Monitored Natural Attenuation
NPDES	National Pollution Discharge Elimination System
OSDF	On-Site Disposal Facility
OU	operable unit
PMP	Performance Management Plan
RBES	Risk-Based End State
RCRA	Resource Conservation and Recovery Act
RIMIA	Receiving & Incoming Material Inspection Area
ROD	Record of Decision
SSOD	Storm Sewer Outfall Ditch
TTA	Tank Transfer Area
WAC	waste acceptance criteria

UNITS

cfs	cubic feet per second
gpm	gallons per minute
ppb	parts per billion
ppm	parts per million

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1.0 INTRODUCTION

1.1 EXECUTIVE ANALYSIS

This section provides an executive analysis of the Fernald Closure Project (FCP) Risk-Based End State (RBES) Vision within the overall context of Fernald's cleanup program and its scope, status, and associated Stakeholder and Regulatory Agency decision-making processes and participants. Our intent in defining our initial RBES Vision is to show the full range of technically supportable ideas that serve as a master compilation of possibilities, while at the same time framing those possibilities within the context of Fernald's regulatory and decision-making landscape.

This context, coupled with an understanding of the current status and ongoing maturation of Fernald's cleanup projects, will assist in future deliberations regarding how the identified variances between existing regulatory agreements and Fernald's master list of candidate possibilities can best be accommodated. Such deliberations, conducted collaboratively with Fernald's Stakeholders and Regulators, will help produce the final list of viable, acceptable initiatives tailored to Fernald's remaining closure work scope and timetable.

1.1.1 Fernald Closure Project Background

The Fernald site consists of a land area of 1,050 acres with about 140 acres dedicated to the original production facility buildings, and 37 acres dedicated to the historical waste storage areas (the waste pits and silos). The site is located near Ross, Ohio, a farming community located about 20 miles northwest of Cincinnati. The prevailing land use surrounding the facility is residential/farming, with light industrial and commercial activities nearby.

To facilitate environmental restoration, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) work scope for the Fernald site was divided into five operable units (OUs): the waste pits (OU1); miscellaneous waste units (OU2); the Production Area facilities and legacy-waste inventories (OU3); the waste Silos (OU4); and Fernald's contaminated environmental media (OU5). CERCLA remedial investigations and feasibility studies are complete for each of the OUs, and five final Records of Decision (RODs) have been signed to establish cleanup levels and document the chosen cleanup remedies for each OU. The RODs were signed between 1994 and 1996, and field cleanup across all of the OUs has been the primary focus ever since. As of fall 2003, cleanup is about 60 percent complete, based on total volumes of remediation waste that has been permanently dispositioned at the respective off-site and on-site disposal locations. A summary of the major remediation projects and their current status is provided in Table 1.1.

Table 1.1. FCP cleanup program status.

Project	Work Scope	Status as of July 2003	2006 Strategy	Completion
Aquifer Restoration	– Remediate contaminated portions (approx. 170 acres) of the Great Miami Aquifer – Treat stormwater and wastewater resulting from site remediation activities	– Project - 66% complete – Extracted more than 11.9 billion gallons of water from the aquifer since 1993 – Treated more than 7.1 billion gallons of water – Removed more than 4,573 pounds of uranium from aquifer since 1993 – Successfully using re-injection well technology to speed aquifer remediation	– All infrastructure will be in place by 2006	2021
Building Demolition	– Dismantle 223 former production plants, support structures, and associated components	– Project - 61% complete – Dismantled 127 structures – Completed Safe Shutdown in March 1999, two years ahead of schedule and $7 million under budget – Current activities focused on D&D of Plants 2/3, 8, General Sump, Pilot Plant, and the Analytical Laboratory	– Add work crews, safety personnel, and equipment – Expedite demolition of structures	2006
Soil and Disposal Facility	– Remediate and dispose of contaminated soil – Certify site as clean and perform natural resource restoration	– Project - 41% complete – Cell 1 – filled and capped – Cell 2 – filled, cap in 2003 – Cell 3 – 57% filled – Cell 4 – 18% filled – Cell 5 – 7% filled – Excavated and dispositioned over 1.1 million cubic yards of contaminated soil – Over 54% of the site is certified "clean" – Completed four natural resource restoration projects	– Adopt self-performance and aggressive approach to work – Resequence work with more parallel activities – Greater integration with D&D and Waste Pit projects – Add Cell 8 to accommodate scope increase	2006
Silos 1 and 2	– Remove 8,900 cubic yards of high activity low-level waste from two concrete silos – Chemically stabilize waste and ship off site for disposal	– Project - 24% complete – Accelerated Waste Retrieval Subproject – 70% complete	– Use commercial design-build approach to integrate project activities and accelerate schedule – Implement a detailed constructability process to maintain required coordination of efforts – Revise design to increase operating flexibility and reduce downtime – Develop options for transportation and disposal	2006

Project	Work Scope	Status as of July 2003	2006 Strategy	Completion
Silo 3	– Remove 5,100 cubic yards of low-level waste from one concrete silo – Ship waste off site for disposal	– Project - 36% complete	– Prepared ROD Amendment and Revised Proposed Plan to allow for treatment only as required to meet permitted disposal facility's waste acceptance criteria – Planning for opportunistic funding that would allow early completion	2006
Waste Pits	– Remediate the contents of six waste pits containing low-level radioactive waste byproducts of uranium and thorium processing	– Project - 70% complete – 89 unit trains pulling 4,829 cars have shipped 566,000 tons of waste	– Operate dryers 24/7 to address increased waste tonnage – Lease additional railcars – Evaluate plans to reduce number of shipments to Envirocare	2004
Waste Management	– Characterize, sample, package, and dispose of low-level radioactive, hazardous, and mixed waste site inventories – Provide site-wide support for waste planning and off-site shipping – Emphasize waste minimization, recycling or reuse wherever practical	– Project - 98% complete – Shipped 6.4 million cubic feet low-level waste to the Nevada Test Site for disposal – 99% complete – Shipped 163,912 low-level liquid mixed waste off site for incineration – 93% complete – Transferred 586,819 cubic feet low-level waste to Waste Pits Remedial Action Project – 94% complete – Transferred 783,868 cubic feet low-level waste to OSDF – 99% complete – Shipped 23,778 cubic feet low-level mixed waste off site for treatment – 89% complete – Dispositioned all containerized waste on Plant 1 Pad – Approximately 5,000 containers remaining in inventory – Continue characterization, visual inspection, and packaging of uranium waste	– Maximize on site disposition of low-level waste – Pursue off-site treatment of mixed waste and low-level waste	2003

Project	Work Scope	Status as of July 2003	2006 Strategy	Completion
Nuclear Material Disposition	– Characterize, package, and ship nuclear materials off site	– Project – 100% complete – Dispositioned 31 million pounds of nuclear product through: ▪ Transfer to other DOE site for programmatic use ▪ Sale to private sector ▪ Transfer to Portsmouth Facility for interim storage under DOE's Uranium Facility Management Group (9.1 million net pounds transferred since June 1999) ▪ Burial of Department of Defense materials off site		2002

At the time that uranium production ceased at Fernald and the RODs were signed bringing an end to the CERCLA investigative studies, it was determined that there were approximately 3.1 million cubic yards of remediation waste that required action and approximately 134 acres of on-site and off-site groundwater contamination in the Great Miami Aquifer that needed to be addressed. A key factor in the site-wide approach to the cleanup remedies, considering the significant volumes of waste involved, was the need for an on-site disposal decision in order to cost-effectively address the large quantities of soil and demolition debris materials that would be generated. However, because an on-site disposal facility would need to be located over the Great Miami Aquifer (a regulated sole-source aquifer that serves as the principal drinking water supply in the region), waivers from State of Ohio solid waste disposal siting prohibitions were necessary to accommodate this need. In order to gain the waivers, the collective remedies approved by the regulatory agencies employed a "balanced approach" in which the higher volume, lower concentration materials would be allowed to remain on site (approximately 77 percent of the total) provided the lower volume, more heavily concentrated materials (23 percent of the total) were disposed of off site, and all affected portions of the Great Miami Aquifer were restored to full beneficial use.

Under this site-wide balanced approach, the final remedial actions selected in the original RODs included: production-facility decontamination and dismantlement (D&D); on-site disposal of the majority of contaminated soil and D&D debris in an engineered 2.7 million cubic yard On-Site Disposal Facility (OSDF); off-site disposal of the contents of the two K-65 Silos (Silos 1&2) and Silo 3; off-site disposal of all waste pit materials, caps, and liners; and off-site disposal of the nuclear product inventory, containerized legacy waste inventories, and the limited quantities of soil and debris not meeting on-site waste acceptance criteria (WAC). The final remedial actions also included extraction and treatment of contaminated groundwater as necessary to restore the Great Miami Aquifer to full beneficial use, and achieve performance-based mass and concentration discharge limits for release of water to the Great Miami River as specified in the OU5 ROD.

As of October 2003, the following cleanup benchmarks have been achieved:

- 600,000 tons of Waste Pits material have been shipped off site and 97 unit trains have made the round trip from Fernald to the Envirocare disposal facility in Utah;
- more than 1.1 million cubic yards of contaminated soil and debris has been excavated and placed in the OSDF;
- 6 of 8 individual disposal cells are in place;
- 9 of 10 uranium production plants have been dismantled;
- 139 individual structures have been dismantled;
- nuclear materials disposition is complete;
- 6.25 million cubic feet of low-level waste has been shipped by truck to the Nevada Test Site for disposal;
- 52 percent of the 1050-acre site footprint has been certified as meeting radiological and chemical cleanup levels; and
- 13 billion gallons of contaminated groundwater has been pumped and treated, as necessary, to achieve surface water discharge limits.

As the above cleanup progress metrics serve to illustrate, the Fernald cleanup is mature and the site is on target for a baseline closure in June 2006, at which time all that will remain will be the ongoing actions

necessary to achieve final completion of the Great Miami Aquifer restoration and the long-term stewardship activities necessary to accommodate and maintain the designated final land use. At closure, approximately 975 acres of the site property will be restored to permit beneficial use as an Undeveloped Park (the selected final land use objective), and approximately 75 acres will be dedicated to the footprint of the OSDF. Other than the disposal facility, no sources of contamination above the site's final remediation levels (FRLs) will remain on site when cleanup is complete.

1.1.2 Fernald's Decision-Making Context (Based on Previous Risk-Based Remedy Decisions)

In December 1984, when the facility was still in uranium production mode, the release of approximately 200 pounds of uranium from a plant dust collector was reported to the National Response Center. This release notification focused nationwide attention on the environmental issues at the Fernald facility and produced increased oversight by U.S. Environmental Protection Agency (EPA) and Ohio EPA. At about the same time, local residents at the site formed a watchdog group entitled the Fernald Residents for Environment, Safety and Health (FRESH). The high public and political profile surrounding activities at the site has remained relatively unchanged since the initial groundswell of attention in 1984.

Through the subsequent CERCLA field investigations, it became clear that Fernald's historical operations had affected a significant off-property land area. Soil concentrations of approximately 20 parts per million (ppm) total uranium (about five times background) were identified in surface soil samples collected off property, immediately adjacent to the eastern and northeastern boundary of the facility. Uranium was detected at above-background concentrations (generally less than two times background) in a widespread area off the Fernald property, and up to 11 square miles of surface soil was projected to have been impacted at these low concentrations. The source of these low concentrations was emissions of dust particles to the atmosphere from plant stacks over the Fernald site's 37-year production history. As documented in the Fernald CERCLA Baseline Risk Assessment, soil uranium concentrations of about 1.5 ppm above background correspond to an incremental lifetime cancer risk (ILCR) of about 10^{-6} for a hypothetical residential/farming land use scenario. In essence, the entire 11-square mile area of above-background contamination surrounding the Fernald site fell within the 10^{-6} risk boundary identified during the Baseline Risk Assessment.

To assist the Department of Energy (DOE) and the community with the decisions being contemplated under the CERCLA cleanup process, the Fernald Citizens Task Force (now known as the Fernald Citizen's Advisory Board, or FCAB) was formed in the early 1990s to make recommendations regarding land use objectives, residual risk levels, and to help develop an approach to navigating the technical and political considerations surrounding the need for an on-site disposal alternative. At the time the remedial decisions were being contemplated, there was little dispute over the need to remove, treat, and/or dispose of the source materials from the source OUs themselves. Likewise, there was little dispute over the need to restore the Great Miami Aquifer to full beneficial use. Rather, as noted by the FCAB in their deliberations, it was the cleanup of the contaminated soil that posed a difficult management problem because of: 1) the large volumes and acreages of contaminated material with associated high costs of cleanup; 2) the risk presented by contaminated soil is real but the harm is seldom imminent; 3) the technology for treating soil is often imperfect; and 4) the materials that are removed during cleanup must be disposed somewhere and no place is eager to host them.

The strategy for finalizing sensible soil cleanup levels (and the resultant extent of soil excavation) involved a process of consensus building with local residents, EPA, Ohio EPA and DOE, and in marrying the CERCLA decision process with the deliberations of the FCAB regarding land-use based final cleanup levels. At the time of the FCAB deliberations, the 11-square mile area represented an excavation volume of nearly 10 million cubic yards, if a 10^{-6} risk target (5 ppm total uranium) were to be selected as the land-use based final soil cleanup level. Present-worth cost estimates for such an excavation effort, when

coupled with the Great Miami Aquifer restoration remedy, approached more than $4.3 billion dollars. As a result of the FCAB's deliberations and educational efforts with the community to help them understand the short- and long-term risk evaluations and tradeoffs involved, effective consensus building led to the selection of a 50 ppm total uranium off-site soil cleanup level (corresponding to a 3.5×10^{-5} ILCR and Hazard Index (HI) of 1.0 for non-carcinogenic health effects) as the appropriate risk-based value. When coupled with the on-site disposal decision for contaminated soil and debris, endorsed as necessary by the FCAB in conjunction with EPA and Ohio EPA, this decision reduced present worth costs from an estimated $4.3 billion as mentioned above, to a more realistic $580 million and, equally important, reduced the area of excavation to approximately 400 acres, down from the potential 11-square miles that was under consideration.

Also, during the solicitation of community input for the remedy decisions, it became clear that virtually no Stakeholders or members of the public were interested in seeing the on-site area of Fernald returned to an unrestricted residential/farming land use following remediation. From this basis, and on the recommendations of the FCAB, EPA, Ohio EPA, and DOE collectively agreed to adopt what was known as Land Use Objective No. 3 (a restricted, non-farming land-use objective) for the setting of sensible on-site soil cleanup levels. Individual constituent cleanup levels for a designated hypothetical Undeveloped Park receptor were then set at an ILCR of 10^{-6} and a HI of 0.2, recognizing that at these target values, other non-farming land uses (e.g., commercial, industrial, and developed park) could be possible for the site in the future while meeting the corresponding land use-specific risk range targets (1×10^{-4} to 1×10^{-6} ILCR and HI=1) considered acceptable by EPA in the National Contingency Plan. These deliberations and the overall consensus building resulted in the selection of Alternative 3A from the Fernald OU5 Proposed Plan (excavation of contaminated soil and placement in an engineered on-property disposal facility to achieve on-site Undeveloped Park risk-based levels) as the preferred remedy for the site, recognizing that it provided a health-protective remedy that is reliable over the long term, yielded the lowest overall short-term risks, and is less costly when compared to the other alternatives. This consensus risk-based decision was then documented in the January 1996 OU5 ROD.

1.1.3 Opportunities and Challenges Facing Future RBES Decisions

As the above background discussion illustrates, the FCAB, in conjunction with local Stakeholders and the Regulatory Agencies, plays a vital role in making the key collaborative Fernald decisions that are risk based and/or final land-use focused. The FCAB also plays a pivotal role in gaining public consensus and educating local public members in the short- and long-term tradeoffs involved in CERCLA remedial decision-making. During recent meetings regarding the initial rollout of Fernald's RBES opportunities, both the FCAB and the Regulatory Agencies strongly pointed out that the risk-based decisions already reached for the Fernald site to arrive at the original cleanup remedies, sensible soil cleanup levels, and land-use preferences have already produced a solid "RBES Vision" for Fernald that, in their mind, requires little further tailoring.

In recognition of this backdrop, it was agreed in concept during the initial dialogue between DOE and its Stakeholders and Regulators that the FCAB would serve as the primary deliberative body for gaining public consensus on acceptable new risk-based initiatives emerging from the RBES Vision. EPA and Ohio EPA (who also sit on the FCAB) would serve as the primary deliberative organizations for determining the regulatory acceptability of the new initiatives, should they require revisions to existing cleanup agreements and/or implementation requirements. Through the collaborative interactions with these primary bodies, the aggressive master list of technically supportable initiatives will be screened for further applicability to arrive at the final shortlist of viable initiatives that can be implemented beneficially given the present status and remaining timetable for the cleanup remedies underway.

Significant ongoing dialogue with the FCAB and the regulatory agencies concerning the upcoming RBES deliverables occurred in early October 2003. The RBES policy was an agenda topic at the FCAB's annual retreat, and was the subject of a quarterly FCAB meeting on October 21, 2003. Individual meetings with local stakeholder groups, such as FRESH, are also underway, along with the featuring of the initiatives during monthly Fernald Cleanup Progress Briefings held for the local public. At the October 21, 2003 FCAB meeting, a consensus was reached between DOE and the FCAB regarding the ongoing interactions that will be necessary to move into the shortlisting process for the initiatives. While FCAB members and Stakeholders clearly noted that several of the items on the master list of possibilities currently pose significant variances to existing cleanup agreements, and therefore would be difficult to accept at this late juncture in the cleanup process, they also noted that several of the other items represent potentially good ideas worthy of consideration that can be examined further in the deliberative process. It was agreed that Fernald would continue to follow the same level of deliberative processes employed during the original CERCLA decision-making (and subsequent ROD changes already in place) in the future consideration of changes to the current plan.

In light of Fernald's decision-making landscape and the RBES interactions already underway, a summary of the master list of technically supportable opportunities that are contained in the RBES Vision, is provided below. These opportunities were all identified in the September 2003 timeframe, for inclusion in the Vision.

- Allow use of an area averaging and hot-spot approach for OSDF soil WAC demonstration (just like soil cleanup standards). Currently, a "not to exceed" approach is required by the OU5 ROD.

- Use the Fernald sediment cleanup levels in all streams and ponds on site. Currently, these levels are limited to the Great Miami River and Paddys Run.

- Use the cross-media aquifer protection soil cleanup levels for subsurface soils (below 3 feet) rather than the surface soil cleanup levels.

- Allow Fernald's outfall lines to be cement-stabilized, or cleaned, and left in place.

- Discharge OSDF leachate that meets surface water cleanup levels to on-site ponds, rather than requiring the leachate to be automatically treated before discharge.

- Consideration of a Monitored Natural Attenuation concept for restoring the Great Miami Aquifer. Under this concept, off-site areas of the plume would be actively restored through groundwater pumping until OU5 aquifer cleanup levels are achieved. On-site areas would be actively restored only where necessary to prevent the recontamination of off-site areas above OU5 cleanup levels.

All of these opportunities would change Fernald's end-state residual contaminant levels under current cleanup agreements, but can be technically supported under a risk-based decision-making concept. These opportunities are presented in detail in the RBES Vision so that the variances between the opportunities and current cleanup agreements, along with the cost/benefits, can be identified and evaluated by Fernald's decision-making participants.

Outside of the RBES process, ongoing improvements to the remediation processes, which do not change the residual risk level or end-state condition of the site, are constantly being identified, developed, and pursued under the normal CERCLA process with Fernald's Stakeholders and Regulators. This process has been in place since the RODs were signed and has been successful in shortening the cleanup schedule and reducing costs, while maintaining the short- and long-term level of protectiveness to the environment

consistent with the agreements in place. This mature and time-tested process remains in place and will continue to be utilized to review new improvements that are identified throughout the remainder of the cleanup effort.

1.4.1 Lessons Learned Regarding RBES Decision Making – Groundwater-Based Opportunities

One of the requirements of the 2003 Fernald Closure Contract Modification Number M038 is the need to identify the most cost-effective groundwater infrastructure to remain at the site when the other baseline work elements defining Site Closure are complete at the end of June 2006. While technically not a RBES Vision opportunity (since the full restoration of the Great Miami Aquifer will occur to the same end state sometime after 2006 regardless of the treatment/infrastructure decisions being contemplated under Modification M038) Fernald is engaged with the FCAB and the Regulatory Agencies regarding the possibilities and options for the D&D of groundwater treatment infrastructure in time for the resultant surface and subsurface soil and debris to be placed into the OSDF before that facility permanently closes.

In early October 2003, an internal working draft of DOE's Comprehensive Groundwater Strategy Report was shared with the FCAB, local Stakeholders, and the Regulatory Agencies, outlining a number of major groundwater treatment alternatives for consideration including the regulatory relief that may be necessary from existing cleanup agreements for each alternative in order to achieve the objectives contemplated. Similar to the consensus reached at the October 21, 2003 FCAB meeting regarding RBES Vision opportunities, it was agreed that Fernald would continue to follow the same level of deliberative processes employed to date in the future consideration of any changes in the current plan for groundwater and wastewater treatment, and the possibility of the early D&D of existing water treatment facilities. As stated at the meeting, DOE does not currently have a preferred alternative, but will work collaboratively with FCAB and the Regulatory Agencies to identify a preferred course of action in the future.

Since the groundwater treatment/infrastructure deliberations are technically not a RBES element, they will continue to be handled outside the RBES process as a normal course of events occurring under the Contract Modification M038 requirement. These ongoing deliberations are mentioned here in the Executive Analysis to illustrate the type of interactions expected by Fernald's Regulatory Agency and key Stakeholder participants on matters related to the RBES Vision.

1.1.5 Regulatory and Stakeholder Inputs Received to Date

The future mission for Fernald will be Legacy Management of the areas of concern left on site. The decisions concerning the final list of hazards to be left on site, as well as the acceptability of a Monitored Natural Attenuation concept for the Great Miami Aquifer that is identified in the RBES Vision (see ***Reader's Note*** below), will be evaluated collaboratively with the participation of the FCAB, EPA, and Ohio EPA. All of the participants have expressed a willingness to consider reasonable new end-state Vision ideas as long as a clear benefit is shown and the participants actively included in the up-front planning and decision-making, with sufficient time and information from which to arrive at acceptable solutions.

During October 2003, initial meetings were held with the FCAB and the Regulatory Agencies to identify issues of concern with the changes that may be contemplated under the RBES Vision. It was clear from the initial interactions that the FCAB and the Regulators are not amenable to changes in groundwater cleanup levels, surface water discharge limits, or other changes that significantly increase residual contamination following remediation, or releases during the remediation process. The FCAB and agencies also raised concerns that the RBES process could create distractions and resource demands that ultimately detract from achieving the 2006 closure schedule if not managed wisely, considering the progress of remediation already being made in the field.

To illustrate the type of issues and concerns that are currently on the minds of the local and political community regarding emerging changes for the FCP, several key items are included in Attachment B to this document:

- an October 9, 2003 congressional letter, signed by Ohio senators and congressmen, raising concerns with the Groundwater Strategy Report and potential changes to existing cleanup agreements;
- a series of articles from October 2003 that appeared in the Cincinnati Enquirer concerning the Groundwater Strategy Report and DOE's decision-making process for arriving at changes to cleanup agreements.

The information contained in both of these items serves to illustrate the overall public and regulatory attitude toward any changes to the current remedies contained in the site's five RODs.

Reader's Note: *Although they are related since they affect the Great Miami Aquifer, the alternative groundwater treatment infrastructure decisions that are being evaluated through Contract Modification M038 do not contain the Monitored Natural Attenuation concept for the Great Miami Aquifer, which has been identified for inclusion in this initial rollout of the RBES Vision document. The Monitored Natural Attenuation concept is a change in the end-state objective for groundwater required by the OU5 ROD, and is therefore being included as an opportunity to be evaluated as part of the RBES process. As the RBES guidance requires, the initial rollout of ideas is to be developed from new thinking aimed at identifying all technically supportable concepts, especially if they are different from current cleanup agreements, so the site will have an opportunity to clarify and justify the current agreements through a variance analysis process under the RBES Vision. On the other hand, the Contract Modification M038 alternatives, regardless of which one is ultimately chosen, are aimed at determining the most efficient and cost-effective means to achieve restoration of the effected portions of the Great Miami Aquifer to the end-state required by the OU5 ROD, and are therefore not a change in the end state (and consequently are not included as RBES initiatives). DOE has intentionally separated the two initiatives so the public can participate in deliberations of decisions under two different sets of objectives.*

1.2 ORGANIZATION OF THE REPORT

This report describes the FCP site mission, cleanup program, and the RBES Vision for the regional context, the site context, and the hazard specific areas. The RBES document is divided into four major sections. Section 1 has provided an executive analysis of the FCP RBES Vision and a summary of the FCP site mission (past, present, and future), the status of the FCP cleanup program, and decision-making context. Section 2 describes the Regional Context RBES, Section 3 describes the Site Specific RBES, and Section 4 provides summaries of the specific hazards associated with the RBES for the FCP. Attached to the RBES Vision document is the Variance Report that summarizes the differences between the current agreements for Fernald's end state and the RBES Vision and several key Fernald RBES press articles.

The RBES Vision for the FCP will be depicted through maps, conceptual site models (CSM), and associated narratives. The RBES Guidance requires only the RBES associated maps, CSM, and narratives; therefore, no current state information in provided in this document. The RBES maps for the Regional Context, Site Context, and Hazard Specific Areas for the FCP are provided in this document and are described below. The setting for the RBES maps is the point in time when final land use is achieved and all long-term stewardship activities are in place, i.e., at the time of site closure. In addition, the RBES maps enable the graphical depiction of the hazards, their associated risks, and the affected populations or receptors.

The Regional Context maps place the FCP site within the context of southwestern Ohio. The Site Context maps encompass the FCP site and the lands immediately adjacent to the site. The Hazard Specific maps provide the greatest detail of the areas of the FCP site that contain hazards that may present risks to human health or the environment.

CSM are intended to communicate risk information to DOE managers, the regulatory community, and the general public. CSM have been built, in block diagram form, to provide information regarding the hazards, pathways, receptors, and barriers (RBES only) between the hazards and receptors. A narrative statement accompanies each CSM to describe in detail the features of the model.

Linking the hazard specific maps to the CSM with supporting narrative will depict the path to be taken to complete the RBES in respect to the hazard areas of concern for the FCP site.

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2.0 REGIONAL CONTEXT RISK-BASED END STATE DESCRIPTION

2.1 PHYSICAL AND SURFACE INTERFACE

The FCP site is located in southwestern Ohio in Hamilton and Butler counties. The topography in southwestern Ohio includes gently rolling uplands with steep hillsides along the major streams such as the Great Miami River and Paddys Run. The counties of Hamilton and Butler do not anticipate any changes in the regional topography (See Figure 2.1b).

The land in Hamilton and Butler counties within the region of the FCP site is privately owned for agricultural, residential, and commercial use. According to the Butler and Hamilton Counties projected future land use, the land will remain privately owned for agricultural, residential, and commercial use. The FCP site will remain under federal ownership. The OSDF and buffer zone will remain DOE property in perpetuity to allow DOE to continuously monitor and maintain the facility. In the event that DOE transfers management of the OSDF to another federal government entity, the appropriate restrictions and limitations will be communicated and implemented (e.g., deed restrictions).

2.2 HUMAN AND ECOLOGICAL LAND USE

The FCP site is located in the vicinity of the communities of Shandon (northwest), Ross (northeast), New Baltimore (southeast), Fernald (south), and New Haven (southwest) and lies on the boundary between Hamilton and Butler counties (See Figure 2.2b).

The land cover of Hamilton and Butler Counties is mainly agricultural vegetated. Land around the communities of Shandon, Ross, and New Baltimore is residential. There are two areas of commercial/industrial land cover: one southwest of Shandon and one along the upper west boundary of the FCP site. Although the land of the FCP site used to be agricultural vegetated, activities conducted to support the production mission have significantly altered the topography; therefore the land cover is barren. The barren land east of the site is a gravel excavation operation.

Based on the 1990 census, the 5-mile radius around the FCP site contains an estimated 22,900 people while the eight-county Cincinnati consolidated metropolitan statistical area has a population of more than 1.7 million and a labor force of more than 920,000. Scattered residences and several villages are located near the FCP property. Residential units are concentrated in Ross to the northeast, in a trailer park to the east, and in New Baltimore to the southeast.

Within 5 miles there are six schools that enroll 3316 students, two day care centers that enroll about 160 children, and residences that house about 8140 children.

The area around the FCP remains predominantly open and agricultural and the site itself was farmed before construction of production facilities in 1951. Residences, many of them farmsteads, are scattered around the area and a dairy farm is located just outside the southeast corner of the FCP boundary. Due to a long history of intensive agriculture, there is no nearby land where a natural environment remains intact.

Commercial activity is generally restricted to the village of Ross, approximately 3 miles to the northeast. Industrial use is concentrated along State Route 128, in a small industrial park south of the FCP property, in the village of Fernald, and along the site's western boundary.

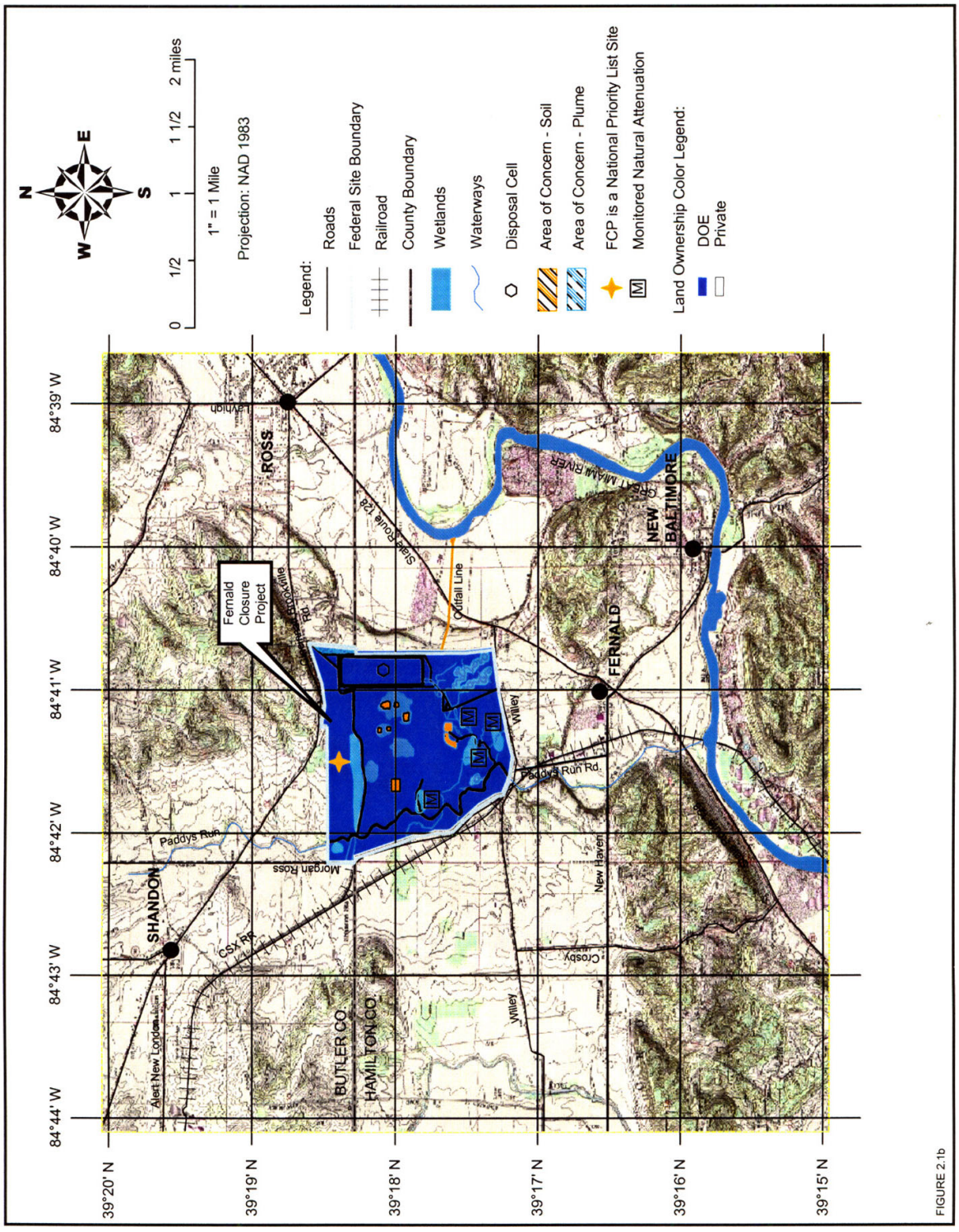


Figure 2.1b. Regional physical and surface interface – RBES.

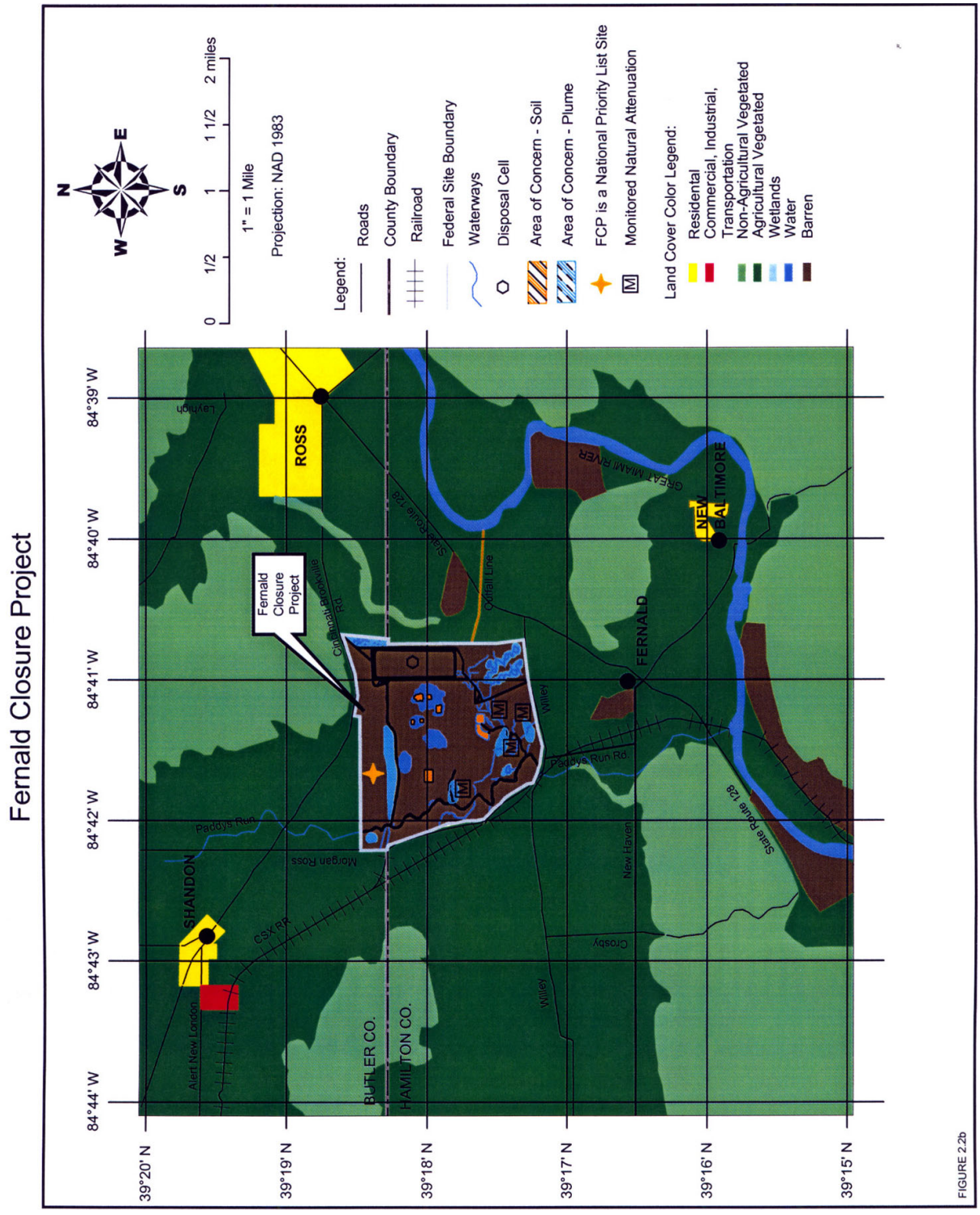


Figure 2.2b. Regional human and ecological land use – RBES.

The Great Miami Aquifer is designated as the sole drinking water source (under Section 1424(e) of the Safe Drinking Water Act) for over 600,000 people in Southwestern Ohio, providing 100 percent and 48 percent of the potable water for Hamilton and Butler counties, respectively. Some residents within a 5-mile radius of Fernald rely on private wells, cisterns or bottled water for potable water. FCP area farms use wells to irrigate their fields and farmers along the Great Miami River irrigate with river water.

The majority of the FCP lies within Hamilton County, Ohio. Hamilton County was consulted during development of the Final Land Use Environmental Assessment (EA) for the FCP. The Hamilton County Planning Commission has a conceptual development plan for the area surrounding the FCP that projects primarily commercial/industrial development immediately adjacent to the western portion of the FCP. The properties immediately to the East and South of the FCP are identified for continued residential and agricultural use. The Northern portion of the FCP lies in Butler County, Ohio and consultation also occurred with Butler County Planning Commission. The property immediately adjacent to the Northern boundary of the FCP is primarily residential and agricultural and is expected to remain in those land uses.

3.0 SITE SPECIFIC RISK-BASED END STATE DESCRIPTION

3.1 PHYSICAL AND SURFACE INTERFACE

The FCP site is a 1050-acre facility located in southwestern Ohio, about 18 miles northwest of downtown Cincinnati. The facility is located just north of the small rural community of Fernald and lies on the boundary between Hamilton and Butler counties (See Figure 3.1b).

The RBES of the FCP site will be an Undeveloped Park with limited public access for educational purposes. The FCP site will remain under federal ownership. The OSDF and buffer zone will remain DOE property in perpetuity to allow DOE to continuously monitor and maintain the facility. In the event that DOE transfers management of the OSDF to another federal government entity, the appropriate restrictions and limitations will be communicated and implemented (e.g., deed restrictions).

The land immediately adjacent to the FCP site is privately owned for agricultural, residential, and commercial use. According to the Butler and Hamilton Counties projected future land use, the land will remain privately owned for agricultural, residential, and commercial use.

Access to the site will be available by the North and South Access Roads. The North Access Road will be accessible by State Route 126 that runs along the northeast corner of the FCP site. The South Access Road will be accessible by Willey Road that runs along the southern property boundary and intersects State Route 128 to the east of the site. The access road around the OSDF will be left to provide access for inspection and maintenance during Legacy Management.

Activities conducted to support the original site mission have significantly altered the topography of the FCP site. The end state of the site will be mainly forest (395 acres) and prairie (327 acres). The OSDF and buffer zone will cover approximately 75 acres, wetlands will cover approximately 81 acres, and lakes will cover approximately 60.4 acres.

Paddys Run flows from north to south along the FCP's western boundary and empties into the Great Miami River approximately 1.5 miles south of the site. Paddys Run is an ungauged, intermittent stream that flows primarily between January and May with an estimated discharge of 0.2 to 4 cubic feet per second (cfs).

Areas of concern left on the FCP site from the original site mission will be the OSDF, four on-site groundwater plumes, the remediated old and new outfall lines, and several areas containing residual contamination in soils and sediments.

3.2 HUMAN AND ECOLOGICAL LAND USE

During the solicitation of community input for the remedy decisions, it became clear that virtually no Stakeholders or members of the public were interested in seeing the on-site area of Fernald returned to an unrestricted residential/farming land use following remediation. Therefore, the final RBES land use of the FCP site will be an Undeveloped Park with limited public access for educational purposes with the goal to educate the public about regional environmental, cultural, historical, and ecological issues (See Figure 3.2b).

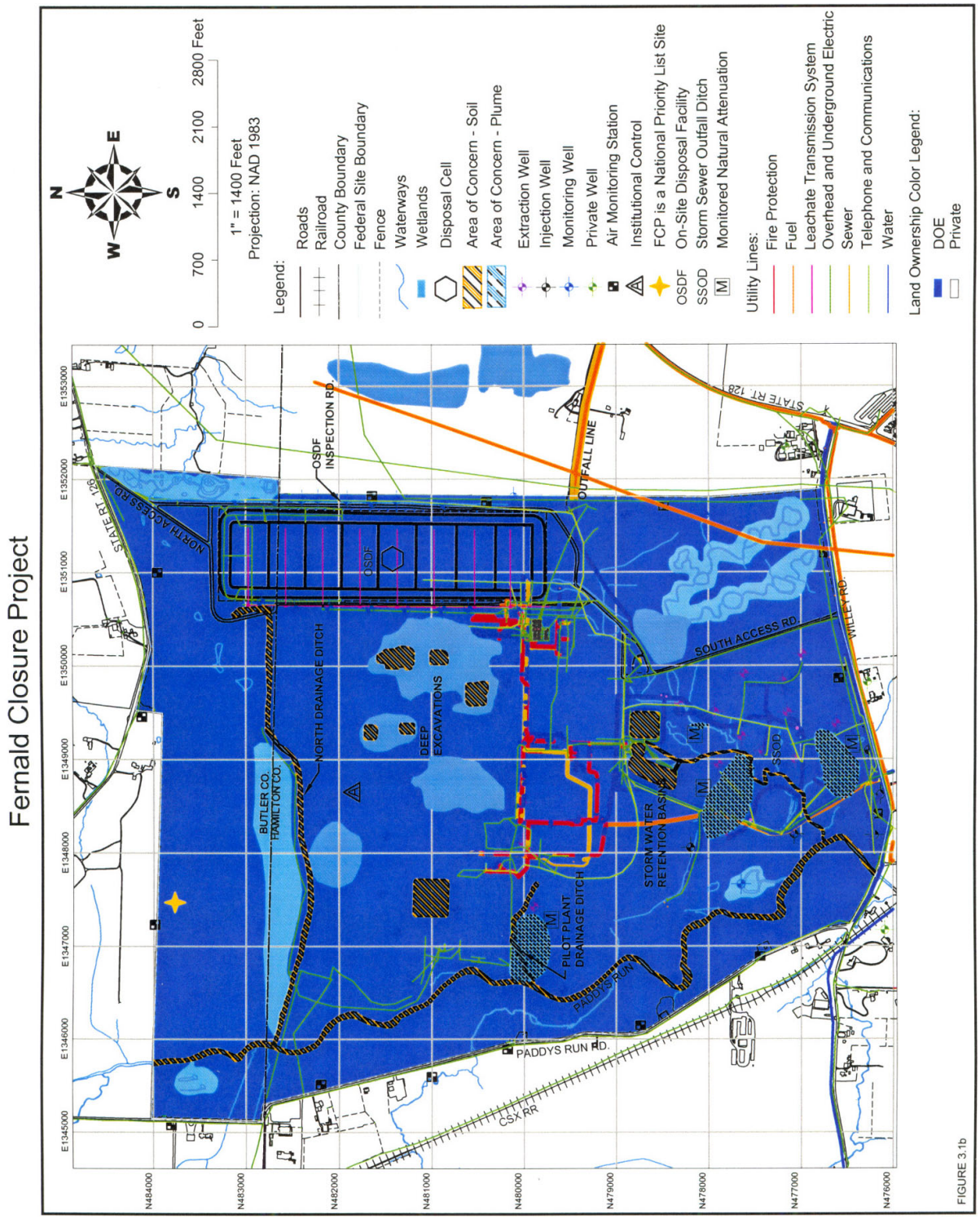


Figure 3.1b. Site physical and surface interface – RBES.

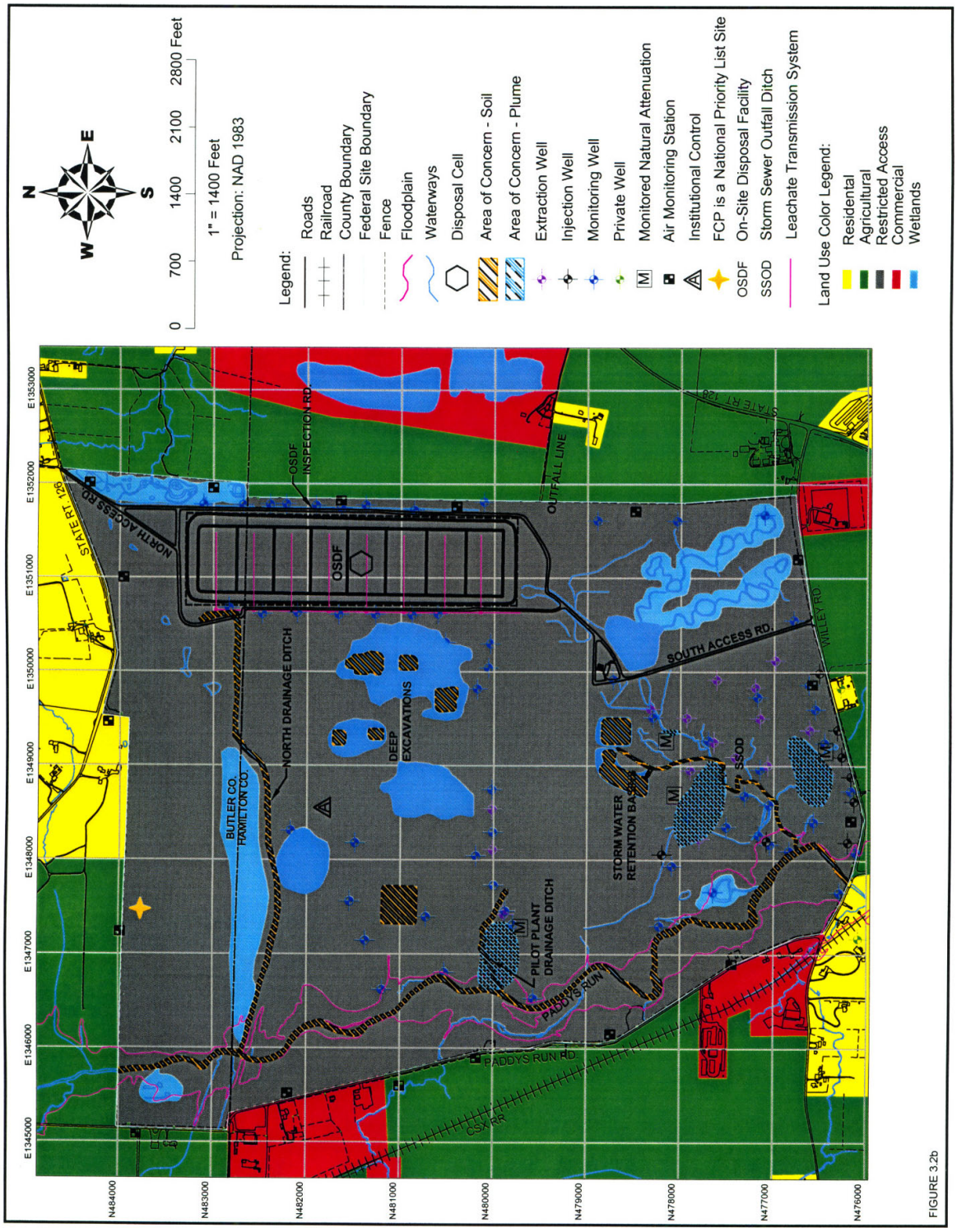


Figure 3.2b. Site human and ecological land use – RBES.

Approximately 900 acres of the site's ecological natural resources will be restored. The restored habitat types will include upland forest, riparian forest, tall grass prairie, wetlands, and open water. Wetlands cover approximately 81 acres of the site. Deep excavations in the former production area will be converted to ponds. Restoration of the site will begin with grading for stability, erosion control, and to establish proper drainage patterns. The revegetation of the site will occur naturally, there will be no planting of saplings, shrubs, or seedlings.

Relatively undisturbed habitats are restricted to the narrow riparian community along Paddys Run and several small woodlots. The Paddys Run corridor represents excellent habitat for the federally endangered Indiana bat and the state threatened Sloan's crayfish inhabits portions of the creek. The riparian corridor along Paddys Run will be enhanced.

The FCP site is situated over the Great Miami Aquifer, which is a sole-source aquifer that generally flows from west to east, with a component of the flow directed towards the south. Approximately 134 acres of on-site and off-site portions of the Great Miami Aquifer have been contaminated by FCP site mission activities. The contaminated groundwater will be extracted, blended with untreated storm water and remediation wastewater, and discharged to the Great Miami River as necessary to restore the Great Miami Aquifer to full beneficial use.

Areas of concern left on the FCP site from the original site mission will be the OSDF, four on-site groundwater plumes, the remediated old and new outfall lines, and several areas containing residual contamination in soils and sediments.

3.3 SITE CONTEXT LEGAL OWNERSHIP

The FCP site will remain under federal ownership with limited public access for educational purposes. The OSDF and buffer zone will remain DOE property in perpetuity to allow DOE to continuously monitor and maintain the facility. In the event that DOE transfers management of the OSDF to another federal government entity, the appropriate restrictions and limitations will be communicated and implemented (e.g., deed restrictions).

The land immediately adjacent to the FCP site is privately owned for agricultural, residential, and commercial use. According to the Butler and Hamilton Counties projected future land use, the land will remain privately owned for agricultural, residential, and commercial use (See Figure 3.3b).

3.4 SITE CONTEXT DEMOGRAPHICS

The final land use of the FCP site will be an Undeveloped Park with limited public access; therefore, there will be no residential use of the site.

The land immediately adjacent to the site is sparsely populated and primarily used for agricultural and commercial purposes. The population density around the FCP site is projected to be less than 10 people per square mile (See Figure 3.4b).

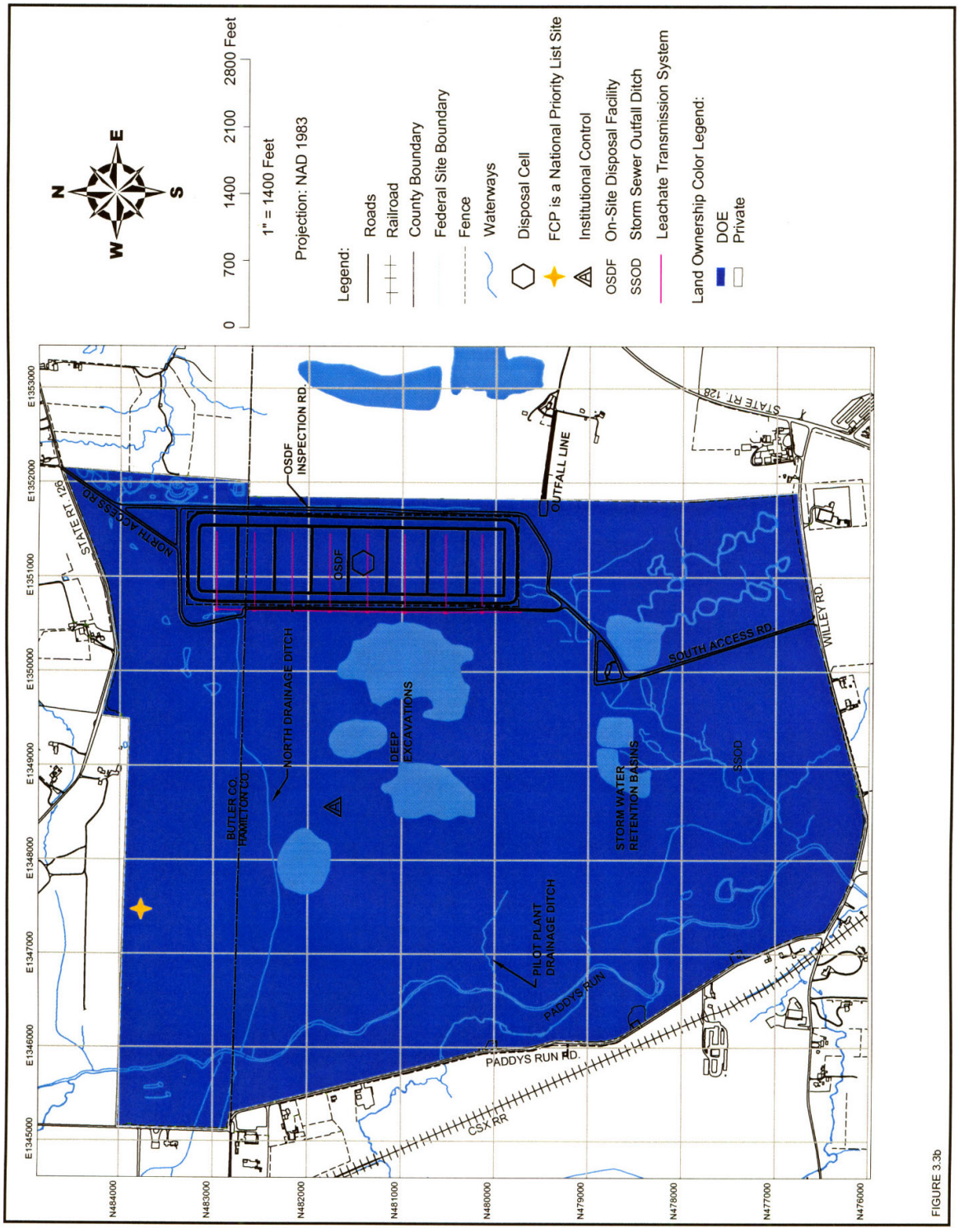


Figure 3.3b. Site legal ownership – RBES.

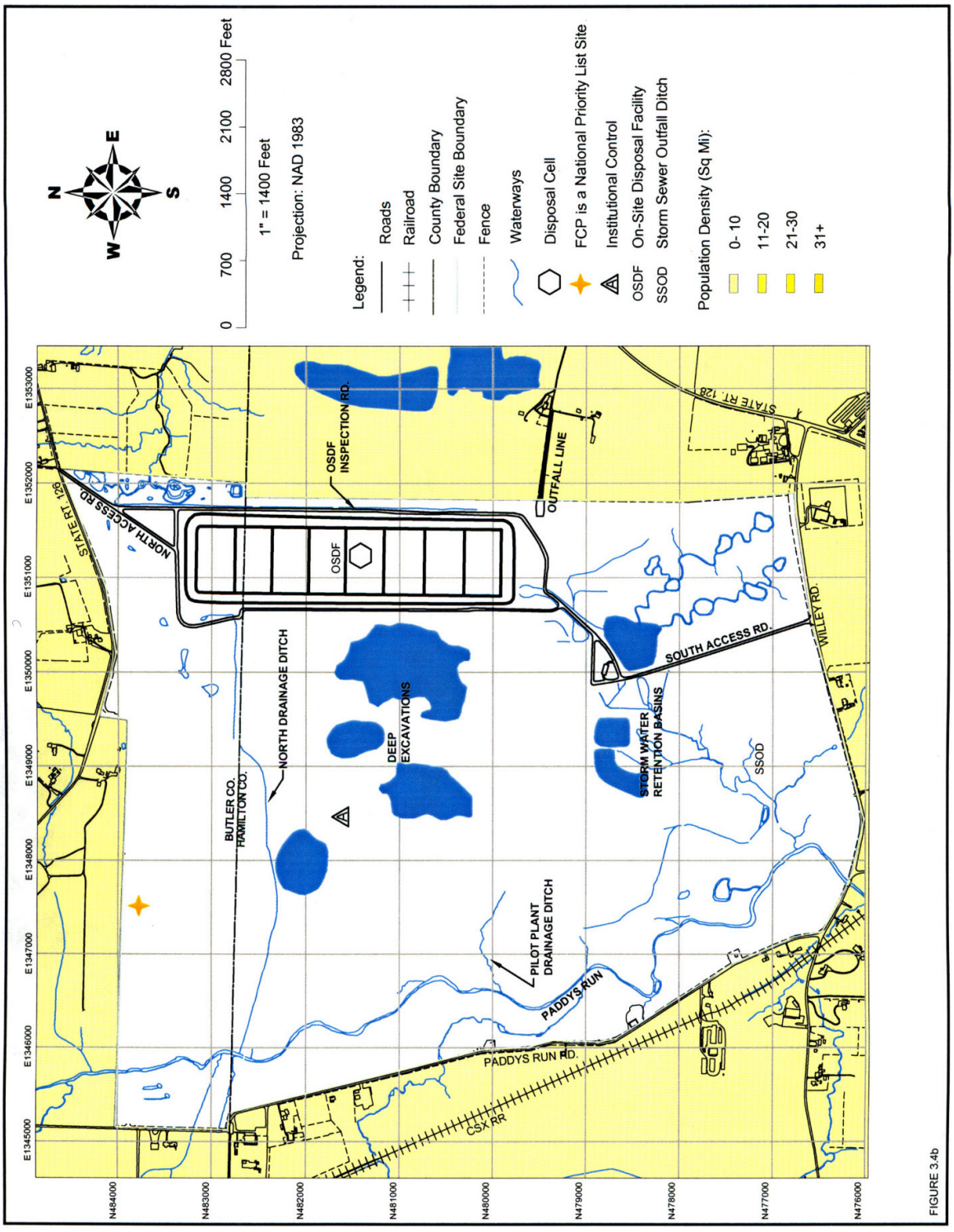


Figure 3.4b. Site context demographics map – RBES.

4.0 HAZARD SPECIFIC DISCUSSION

Four hazard areas of concern have been identified for the FCP site (See Figure 4.0b). These hazards are components of the RBES Vision that vary from the current agreements. The selected remedial strategies for the hazards are designed to be protective of human health and the environment.

The following sections describe the hazard areas and the selected remedial strategies in detail. In addition, maps, CSM, and narratives have been developed to depict each of the hazard areas. **(Please Note: The CSM development process outlined in the RBES Guidance indicates that for a given hazard all possible exposure mechanisms and receptors be depicted on the CSM even if the barrier or intervention that has/will be implemented will limit or eliminate the exposure mechanism or risk to the receptor.)**

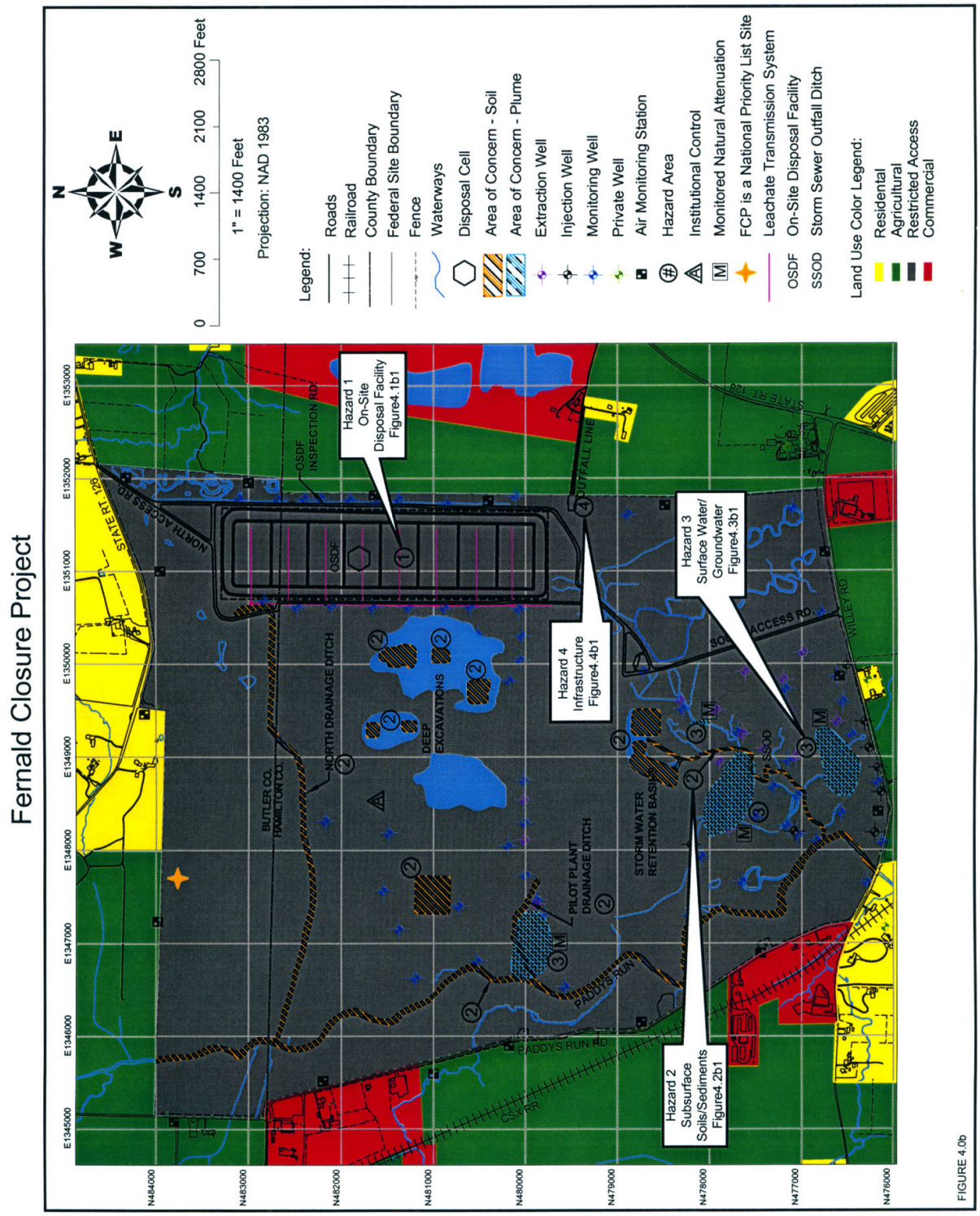


Figure 4.0b. Site wide hazard map – RBES.

4.1 HAZARD AREA 1 – ON-SITE DISPOSAL FACILITY

Background

Through Fernald's five RODs, it was decided that the site's smaller volume of more highly contaminated material will be disposed off site and the larger volume of material with low levels of contamination that can be safely contained will be disposed on site. The OSDF is a result of this "balanced approach" to waste management at Fernald. Excavated soil and debris will be disposed in the OSDF, or if it does not meet the on-site WAC, at an off-site disposal facility. Combined with waste streams from other site remediation activities, a total of 2.5 million cubic yards of soil and debris will be placed in the OSDF. Approximately 85% of the material destined for the OSDF will be soil and soil-like material and the remaining 15% will be debris from the demolition of site buildings. In accordance with Fernald's RODs, the OSDF will only accept wastes from the Fernald Site.

RBES

The OSDF will be an eight-cell, 75-acre, fenced facility left on the FCP site after site closure (See Figure 4.1b1). The OSDF will be capped with an engineered cover. The liner will have leak detection and leachate collection and transmission systems. A buffer zone and perimeter fence will be established around the disposal facility. The OSDF and buffer zone will remain DOE property in perpetuity in order to allow DOE to continue maintenance and monitoring of the facility. In the event that DOE transfers management of the OSDF to another federal government entity, the appropriate restrictions and limitations will be communicated and implemented (e.g., deed restrictions). The OSDF fence will be maintained by DOE in perpetuity.

The OSDF WAC will be applied to materials with the consideration of the average WAC resulting from mixing within each cell. This practice was the original intent and basis of the WAC. The WAC of the OSDF will be applied by using contaminant-of-concern-specific average concentration within each cell; therefore, materials acceptance for disposal within the OSDF would be based on the overall average concentrations of contaminants within the cell meeting WAC instead of the not to exceed limits.

The OSDF was engineered and constructed to accept waste material that meets the WAC based on cell average concentration. The RBES Vision will continue to be fully protective of human health and the environment (See Figure 4.1b2).

All below WAC Resource Conversation and Recovery Act (RCRA) soil and the Silos debris will be disposed of in the OSDF.

The OSDF leachate with an approximate flow rate of 1 gallons per minute (gpm) will be discharged to surface water bodies in the former production area without further treatment as long as all the surface water FRLs are met. Directly discharging the OSDF leachate could contribute to an earlier removal of the Advanced Wastewater Treatment Facility.

The 1-gpm flow of leachate will not likely impact the overall ability of the surface water to meet FRLs so implementing the RBES Vision will continue to be fully protective of human health and the environment.

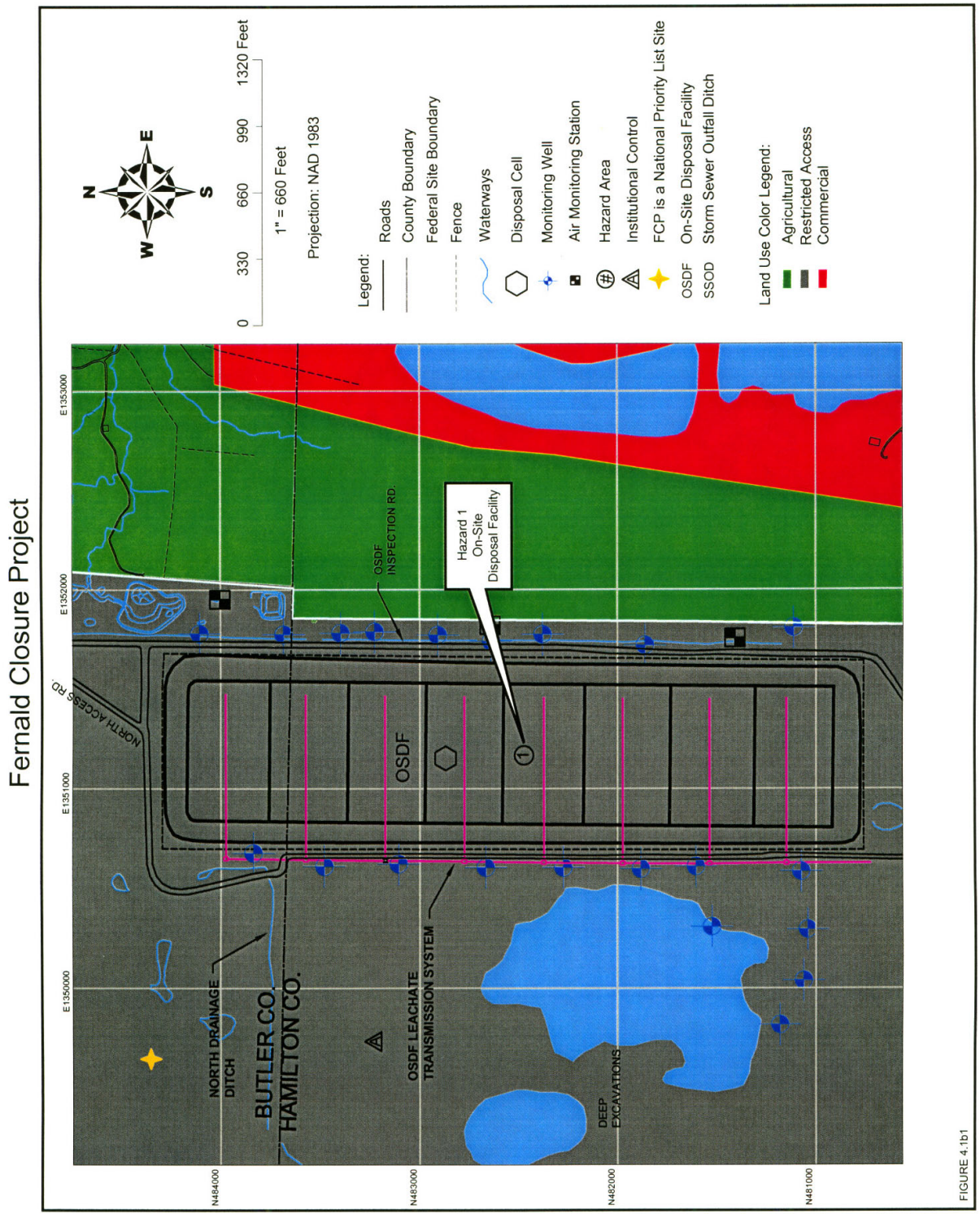


Figure 4.1b1. Hazard Area 1 OSDF map – RBES.

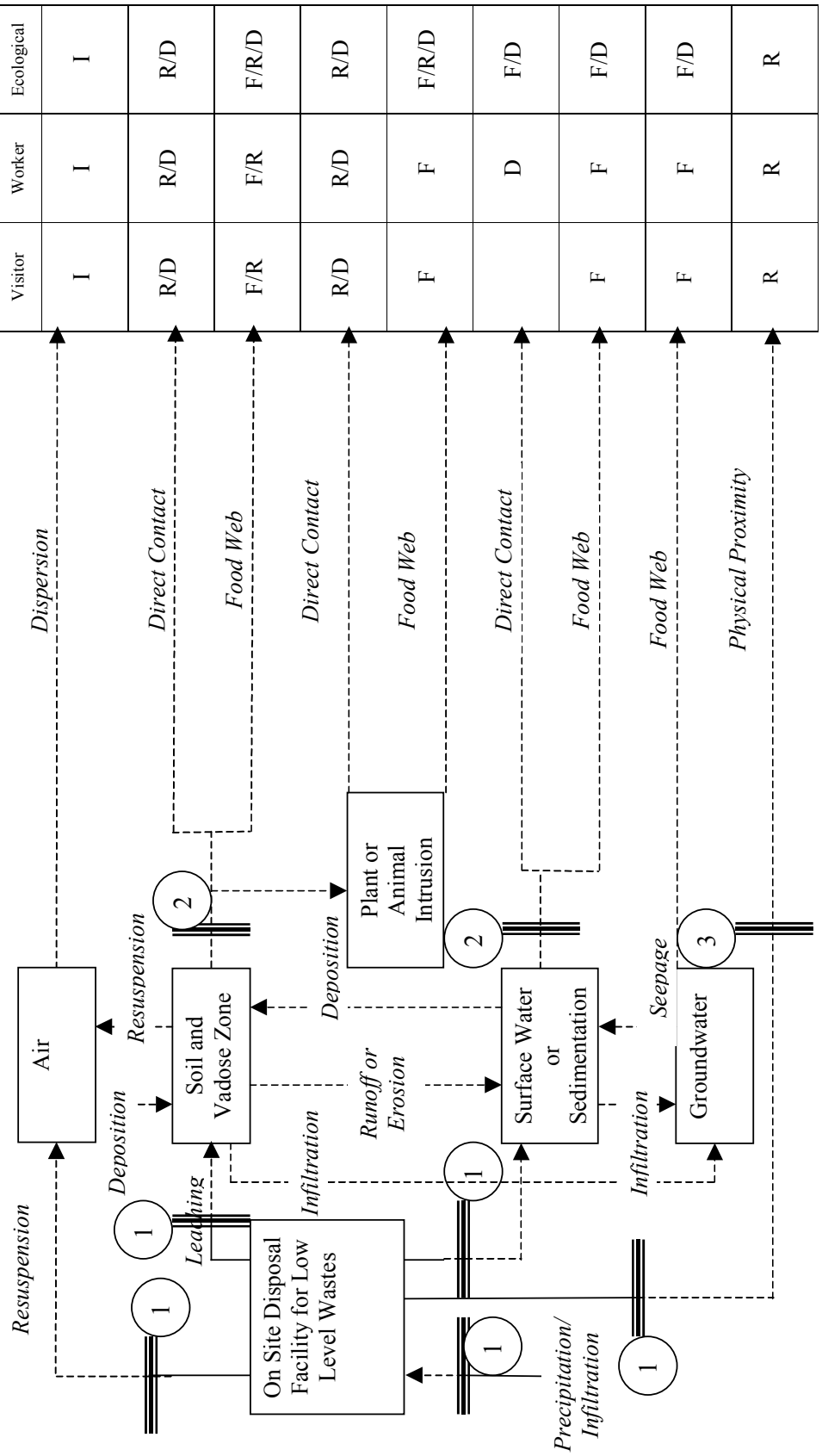
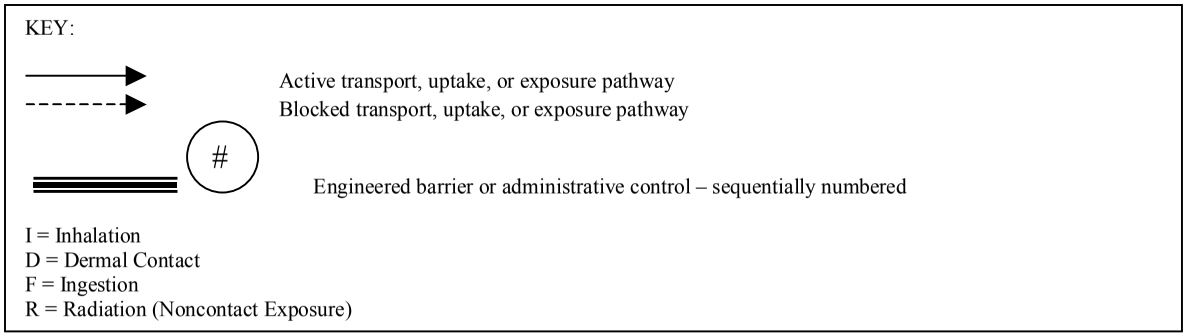


Figure 4.1b2. Hazard Area 1 OSDF CSM – RBES.



Narrative – Potential Release Mechanisms
This is a simplified conceptual model of potential environmental release mechanisms and exposure pathways for the OSDF containing soil, debris, concrete, metal with a high volume but low content of uranium, metals, and/or other long lasting contaminants. While no release to the environment is assumed, this model considers potential release and exposure pathways.

The potential release mechanisms to the environment are (a) resuspension of contaminated particulate matter, (b) surface runoff, (c) leakage or leaching to subsurface soils from the facility, and (d) rupture of cap from settlement, plant intrusion, animal burrowing or erosion. Besides release through primary mechanisms, the contaminants introduced into the environment are likely to flow between different environmental media such as air, surface soil, surface water and groundwater due to interconnecting mechanisms such as runoff, deposition, infiltration, etc.

Based on these complex interconnecting transport mechanisms, potential human exposure mechanisms are: ingestion of plants grown using contaminated water; consumption of possibly contaminated fish and wildlife; direct contact with contaminated soils; possibly inhalation of resuspended particulate matter; and physical proximity to gamma emitting radionuclides. In addition to exposure pathways associated with environmental releases, direct exposure due to inadvertent intrusion is also considered as a significant hazard.

The potential ecological exposure mechanisms are likely to be ingestion of contaminated water, ingestion of plants grown using contaminated water, secondary ingestion of aquatic organisms that uptake contaminants through sediments or water, direct contact with contaminated soils, and inhalation of vapors or suspended particulate matter. There may also be a possibility of direct exposure to gamma emitting radionuclides due to inadvertent intrusion.

Narrative – RBES Barriers/Interventions
The steps taken to mitigate potential exposures are as follows:

1. The OSDF is constructed with a composite liner and cap of soil and geosynthesis. The liner has leak detection and leachate collection and transmission systems.
2. Periodic inspections and maintenance of the final cover will occur as well as periodic monitoring and maintenance of the leak detection system and groundwater monitoring system to ensure the protection of human health and the environment.
3. A buffer zone and perimeter fence will be established around the OSDF to restrict access to the public. The OSDF and buffer zone property will remain in DOE ownership in perpetuity. In the event that DOE transfers management of the OSDF to another federal government entity, the appropriate restrictions and limitations will be communicated and implemented (e.g., deed restrictions).

4.2 HAZARD AREA 2 – SUBSURFACE SOILS/SEDIMENTS

Background

Following 37 years of operations, air deposition, and waste disposal activities, Fernald soil and debris became contaminated with radionuclides and chemicals at levels that necessitated remediation.

As required by the OU2 and OU5 RODs, contaminated soil above negotiated cleanup levels is being excavated. The site areas requiring excavation cover 400 acres and include the Lime Sludge Ponds, Southern Waste Units, and soil under the Waste Pits and Silos. Surface soil FRLs are being used for the remediation of all soil on the FCP. Excavated soils are properly disposed on site in the OSDF if they meet OSDF WAC or at an off-site disposal facility.

RBES

Sediment FRLs (210 ppm uranium) will be applied to all streams, ponds, and other excavations targeted for future ponds and open water (See Figure 4.2b1). Streams and ponds do not have the same exposure pathways as soil areas, due to water coverage.

The soil FRL takes into account the inhalation pathway and is therefore lower than the sediment FRL, which assumes no inhalation pathway. The ponds and open water will have permanent water coverage resulting in no change in risk, due to use of the sediment FRLs. Paddys Run does dry up in the late summer months, but controls (e.g., gates or ropes and signs) will be placed at access locations to keep people from utilizing the streambed in unallowable ways (e.g., motorcycles, ATVs).

Cross-Media Preliminary Remediation Goals (CPRGs) will be applied to subsurface soil instead of surface soil FRLs. This will reduce overall excavation of subsurface soils that have no surface exposure pathways. Soils removed during deep excavation of below grade structures will be segregated and used for backfill, as long as soil FRLs or CPRGs are met.

The use of the CPRGs will continue to be fully protective of the Recreational User of the site (See Figure 4.2b2). Any soil that meets CPRGs will be buried, eliminating the exposure pathway to any soil that is above soil FRLs.

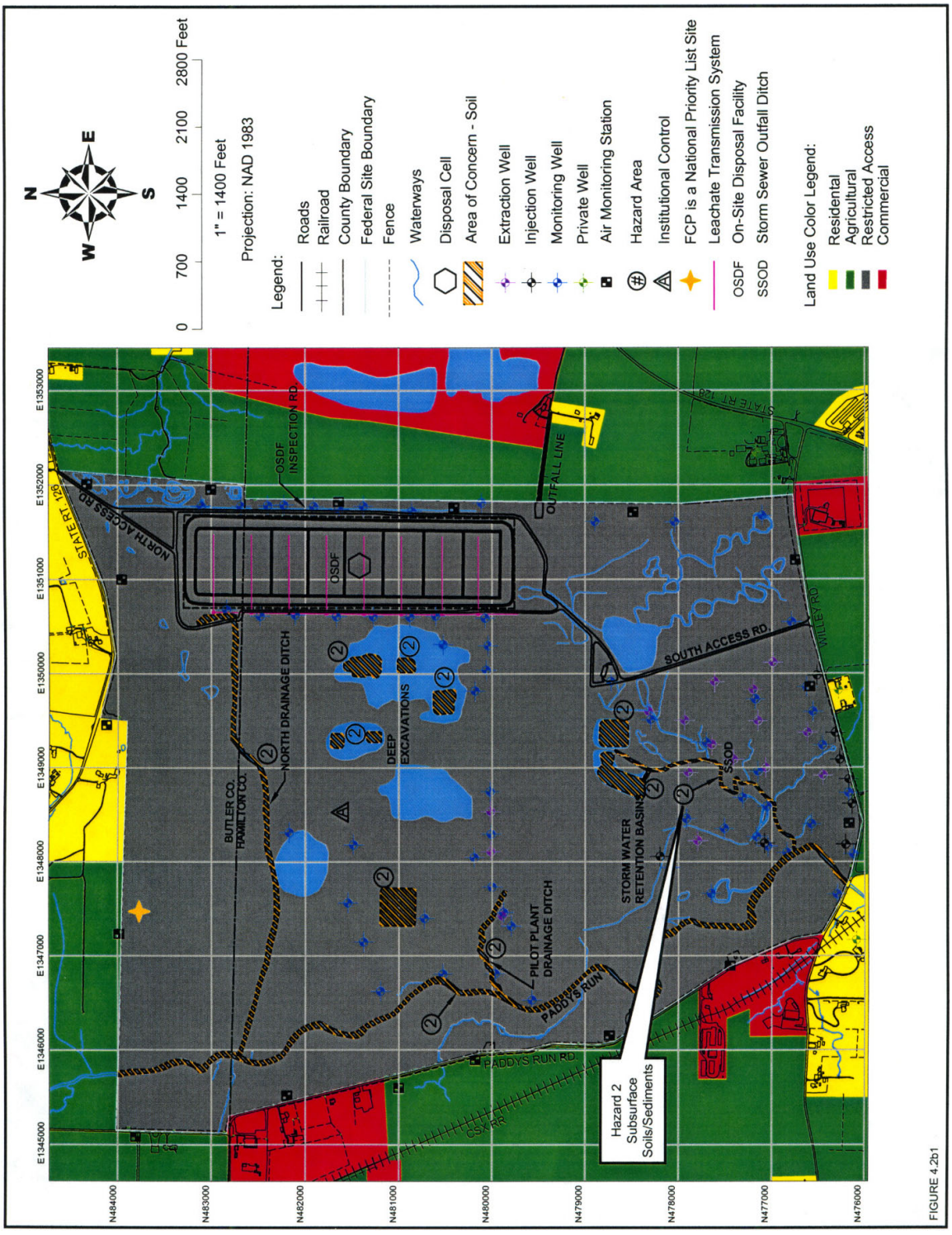


Figure 4.2b1. Hazard Area 2 subsurface soils/sediments map – RBES.

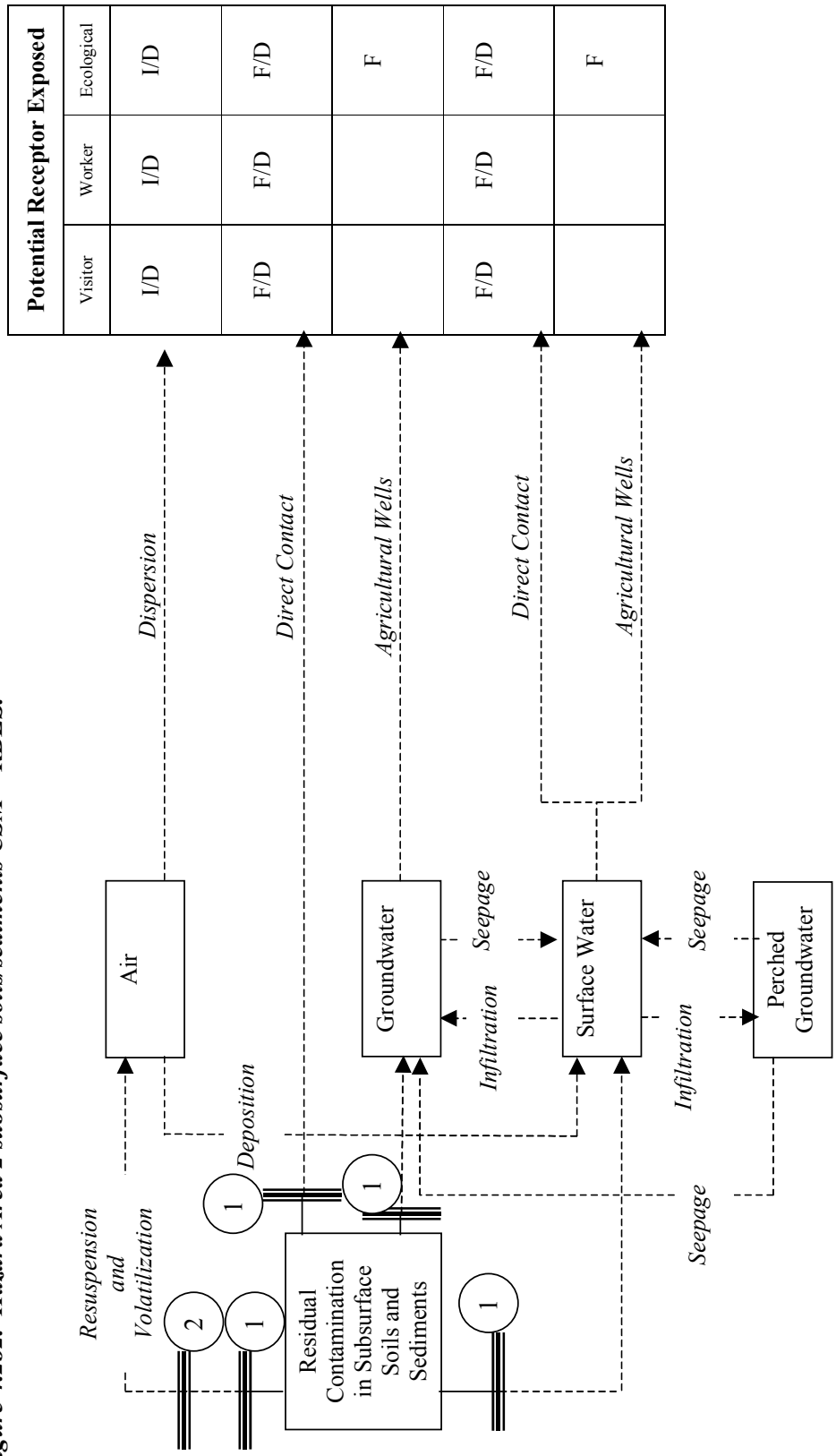
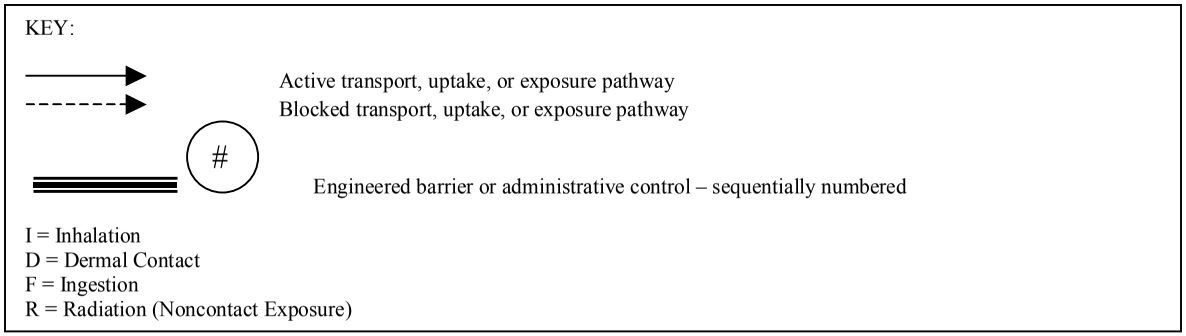


Figure 4.2b2. Hazard Area 2 subsurface soils/sediments CSM – RBES.



Narrative – Potential Release Mechanisms
This is a simplified conceptual model of the potential environmental transport and exposure pathways for residual contamination at Fernald. While no release to the environment is assumed, this model considers potential release and exposure pathways.

The potential predominant release mechanisms to the environment are (a) resuspension of contaminated particulate matter, (b) volatilization of exposed chemical residuals, (c) erosion and surface runoff to surface water bodies, and (d) leaching of residual contamination into groundwater. No commercial, agricultural, or residential use of water is envisaged. Besides release through primary mechanisms, the contaminants introduced into the environment are likely to flow between different environmental media such as air, surface soil, surface water and groundwater due to interconnecting mechanisms such as runoff, deposition, infiltration, etc.

Based on these interconnecting transport mechanisms, potential human exposure mechanisms are: inhalation of volatilized vapors and resuspended particulate matter, and direct contact with contaminated soil or surface water. Groundskeepers, because they are at the site on a regular basis, would have the highest potential for exposure.

The ecological exposure mechanisms are likely to be inhalation of volatilized vapors and resuspended particulate matter, ingestion of contaminated water, ingestion of plants grown using contaminated water, secondary ingestion of aquatic organisms that uptake contaminants through sediments or water, direct contact with contaminated soils or water.

Narrative – RBES Barriers/Interventions
The steps taken to mitigate potential exposures are as follows:

1. Soils remaining in streams, ponds, and excavations targeted for future ponds and open water will meet the sediment FRL of 210 ppm uranium. Subsurface soils will meet CPRGs.
2. Sediments and subsurface soils are covered by water and surface soil, respectively; therefore, there is no pathway to air and no risk of exposure by inhalation.
3. Intervention - The FCP site will remain federal government property with limited public access for educational purposes.

4.3 HAZARD AREA 3 – SURFACE WATER/GROUNDWATER

Background

Fernald is located over the Great Miami Aquifer, one of the largest sources of drinking water in the nation. Following years of uranium production, the aquifer became contaminated with uranium. The levels of uranium in the groundwater are above the drinking water standard of 30 parts per billion (ppb) set by U.S. EPA. Through the Aquifer Restoration subproject, the contaminated portion of the aquifer will be restored by reducing the uranium concentration level to the drinking water standard.

The OU5 ROD documents DOE's commitment to restore the Great Miami Aquifer within 27 years. This is being accomplished by pumping the contaminated on and off-site groundwater plume from beneath 134 acres and treating it at the Advanced Wastewater Treatment (AWWT) Facility to meet a discharge limit to the Great Miami River of no greater than 30 ppb total uranium concentration.

RBES

Treatment of the groundwater plume will consist of pumping the existing extraction wells, blending the flows from the wells with untreated storm water and remediation wastewater, and discharging the blended flow to the Great Miami River. Discharging will continue until the offsite plume has met groundwater FRLs (predicted to be in 2017). Once it has been verified that the offsite plume has met FRLs, monitored natural attenuation (MNA) of the remaining four on-site areas where concentrations are still above the uranium FRL for groundwater will occur (predicted to be needed until 2068) (See Figure 4.3b1). Three of the on-site areas are located below the south central portion of the site and one on-site area is located below the Pilot Plant Drainage Ditch. MNA will not require continued pumping; therefore, no operating costs will be incurred other than those for monitoring and reporting.

In order to blend untreated storm water, remediation wastewater, and groundwater for discharge to the Great Miami River, the discharge requirement for uranium to the River will be increased from 30 ppb in the outfall line to 530 ppb in the river outside the mixing zone with no mass limit. Estimates reveal that at the current National Pollution Discharge Elimination System (NPDES) permitting basis for flow discharged to the Great Miami River (13.3 cfs) at the Ohio EPA derived low flow rate condition of the Great Miami River (706 cfs) the FCP could discharge approximately 28,000 ppb uranium and still meet the 530 ppb surface water FRL. Moving the compliance point to outside the river mixing zone will allow FCP to safely discharge larger quantities of water and reduce or eliminate the amount of water needing treatment at the AWWT Facility.

Increasing the discharge requirement for uranium to the river will continue to be fully protective of human health and the environment (See Figure 4.3b2). Based on current (September 2003) extraction well uranium concentrations, well field composite uranium concentrations will not exceed 100 ppb, which is much less than the 530 ppb discharge requirement (the 10^{-6} risk-based surface water FRL). In addition, final land use restricts access to the FCP site; therefore, there is no risk to the Recreational User.

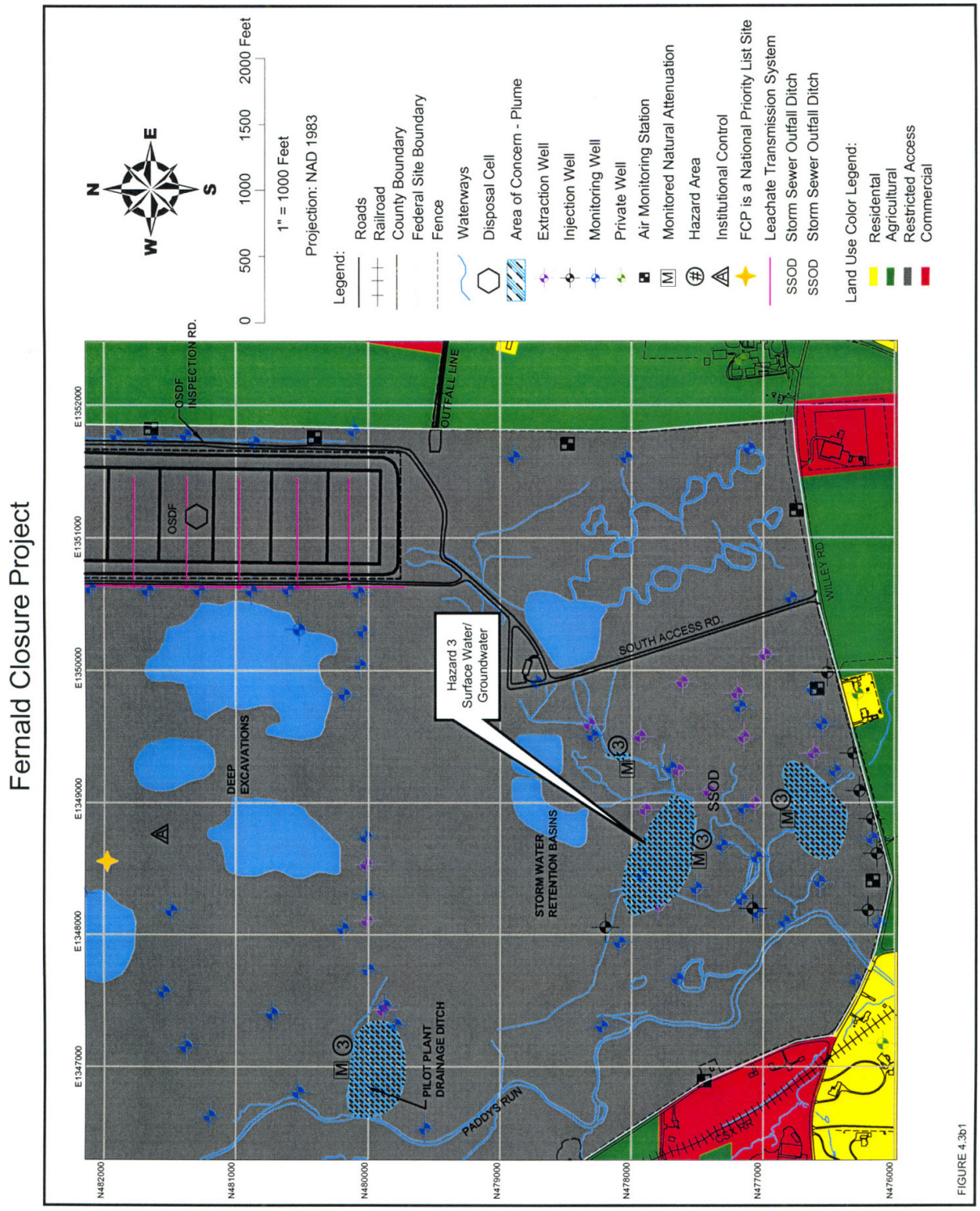
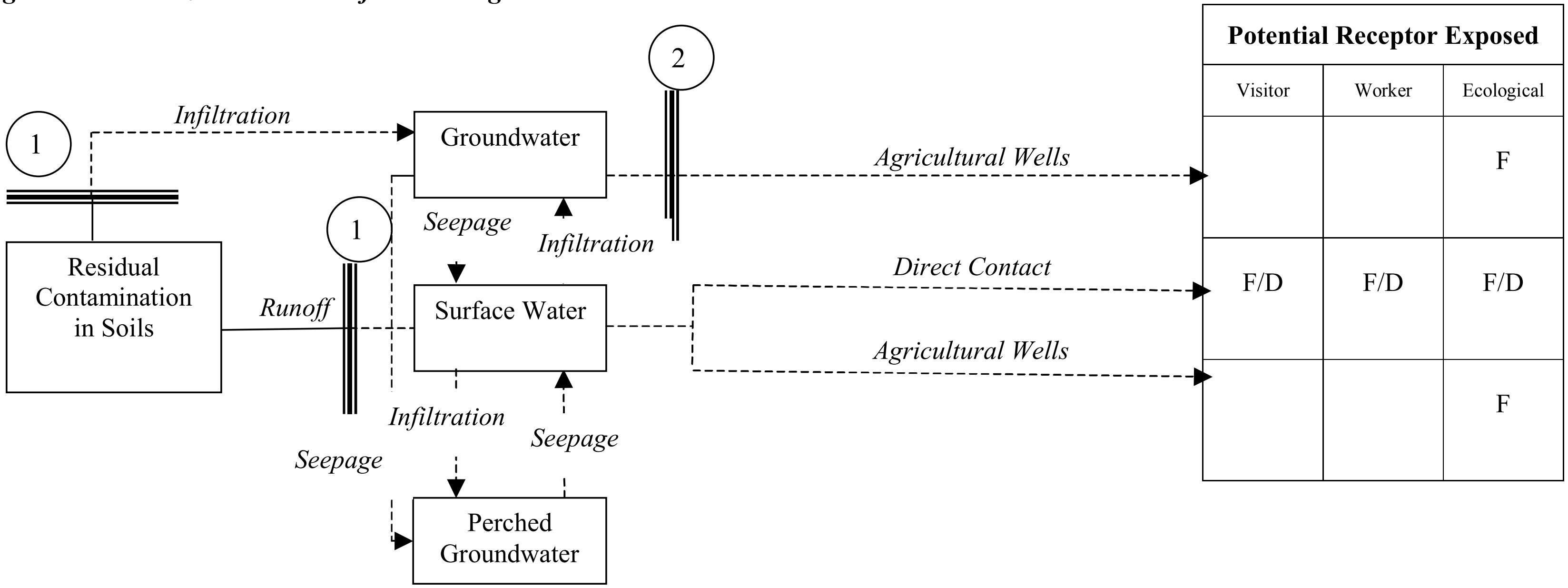
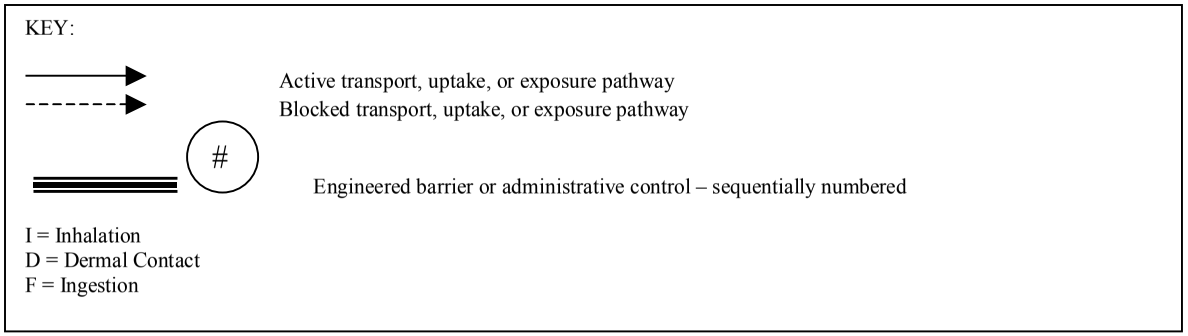


Figure 4.3b1. Hazard Area 3 surface water/groundwater map – RBES.

Figure 4.3b2. Hazard Area 3 surface water/groundwater CSM – RBES.





Narrative – Potential Release Mechanisms
This is a simplified conceptual model of potential environmental transport and exposure pathways for uranium contaminated surface water and groundwater. While no release to the environment is assumed, this model considers potential release and exposure pathways.

The primary source of contamination to the surface water and groundwater is the residual contamination in the soils. Treatment of the groundwater plume will consist of pumping the existing extraction wells, blending the flows from the wells with untreated storm water and remediation wastewater, and discharging the blended flow to the Great Miami River. Discharging will continue until the offsite plume has met groundwater FRLs. Once it has been verified that the offsite plume has met FRLs, MNA of the remaining three on-site areas where concentrations are still above the uranium FRL will occur. In order to blend untreated storm water, remediation wastewater, and groundwater for discharge to the Great Miami River, the discharge requirement for uranium to the river will be increased from 30 ppb in the outfall line to 530 ppb (the 10^{-6} risk-based surface water FRL) in the river outside the mixing zone with no mass limit.

The potential predominant release mechanisms of contaminants in wastewaters to the environment are (a) infiltration of surface water to groundwater and perched groundwater and (b) seepage from perched groundwater to surface water, perched groundwater to groundwater, and groundwater to surface water.

The potential exposure mechanism to the Recreational User is direct contact with and ingestion of surface water.

The potential exposure mechanism to ecological receptors is ingestion of contaminated well water and direct contact with surface water.

Narrative – RBES Barriers/Interventions
The steps taken to mitigate potential exposures are as follows:

1. Monitoring of the discharge stream to the Great Miami River will continue to ensure that the stream meets the surface water FRL of 530 ppb.
2. Use of contaminated groundwater off site will be prohibited until the off-site plume meets the U.S. EPA Drinking Water Standard for uranium of 30 ppb.
3. Intervention - The FCP site will remain federal government property with limited public access for educational purposes.

4.4 HAZARD AREA 4 – INFRASTRUCTURE

Background

The OU2 and OU5 RODs require the excavation of contaminated soil above negotiated cleanup levels. The site areas requiring excavation cover 400 acres. In addition to contaminated soil, building foundations, concrete storage pads, parking lots, roads, and below-grade piping will be removed as part of soil excavation.

RBES

The outfall lines to the Great Miami River, the cofferdam, and other structures at the Great Miami River will be left in place (See Figure 4.4b1).

The old outfall line will be grouted in place. The outfall line is a cast iron pipe that runs approximately 0.66 miles from the FCP to the Great Miami River. Removing the old out fall line would require extensive excavation of surrounding land and removal and replacement of State Route 128 resulting in the obstruction of traffic.

The new outfall line will be cleaned and abandoned in place. The new outfall line is constructed of high-density polyethylene (HDPE) and can be cleaned on the inside to eliminate the risk of contaminants leaching into surrounding soils. Abandoning it in place will save construction costs associated with excavation of the lines.

Implementing the RBES Vision will continue to be fully protective to human health and the environment (See Figure 4.4b2).

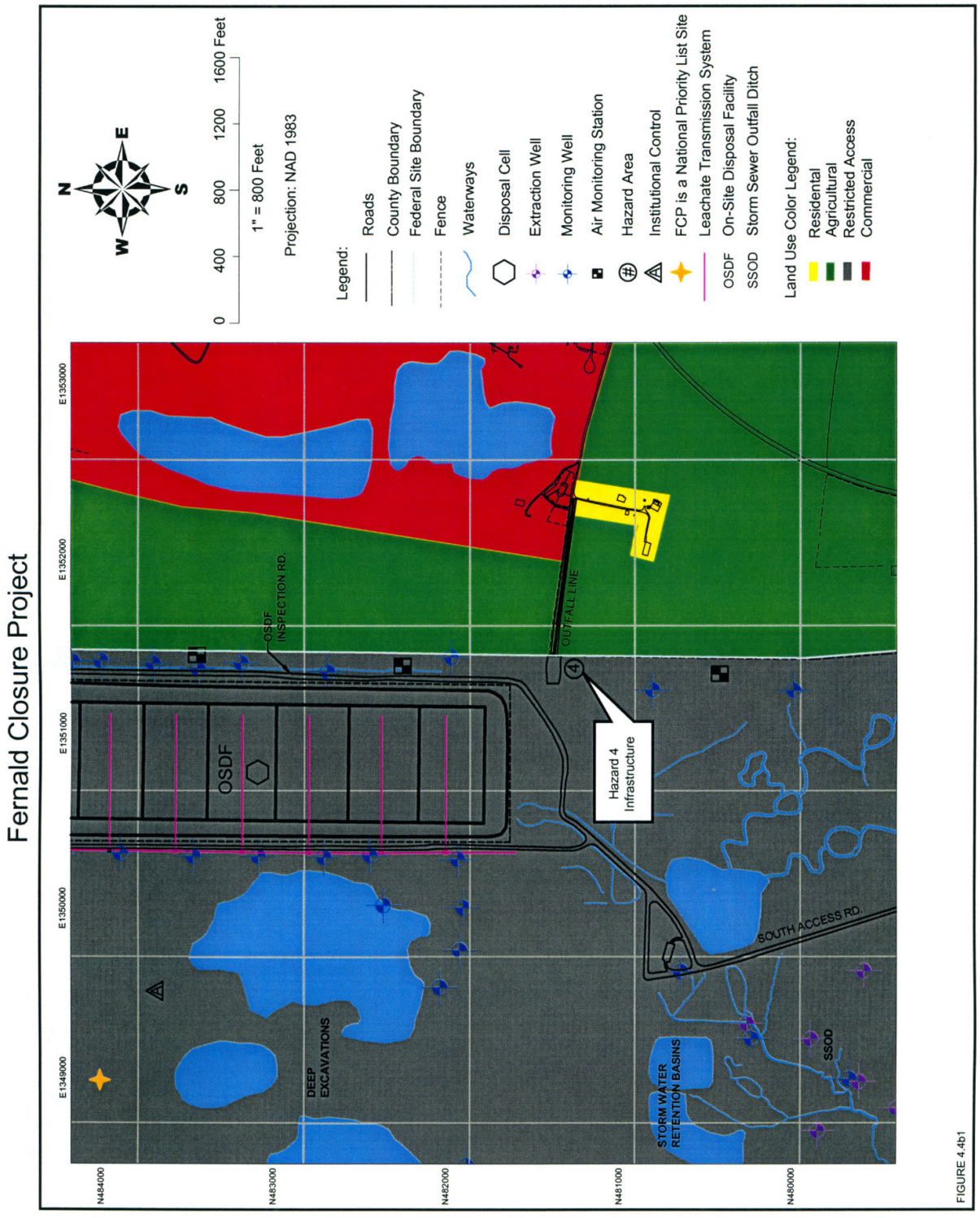


Figure 4.4b1. Hazard Area 4 infrastructure map – RBES.

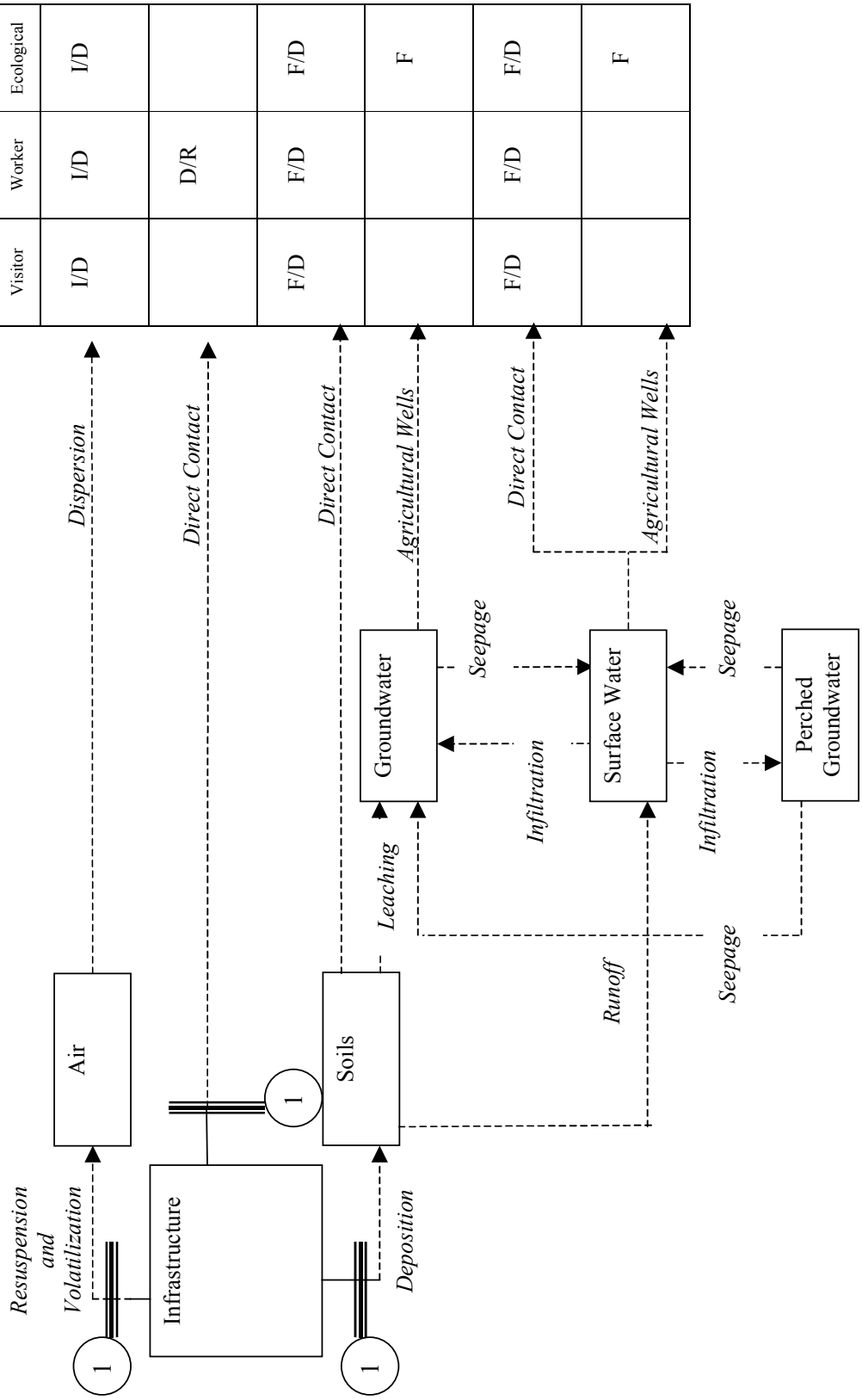
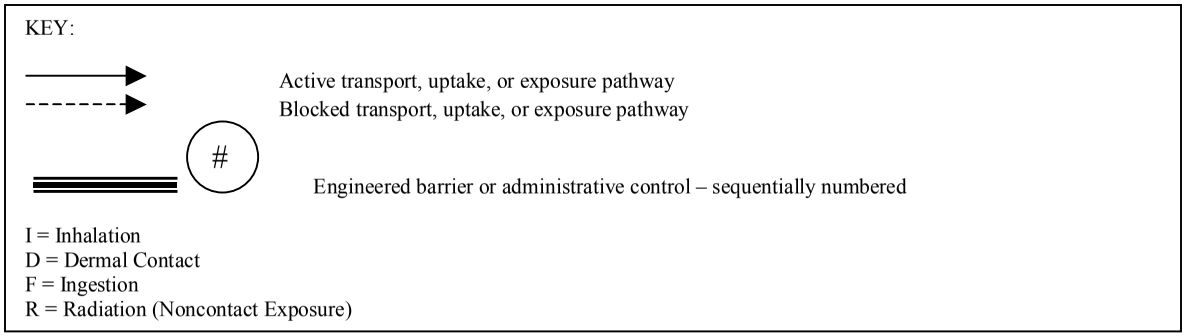


Figure 4.4b2. Hazard Area 4 infrastructure CSM – RBES.



Narrative – Potential Release Mechanisms
This is a simplified conceptual model of the potential environmental transport and exposure pathways for infrastructure left on site. The outfall lines, cofferdam, and other structures at the Great Miami River will be abandoned in place. Institutional controls will ensure that the outfall lines are not excavated or removed. While no release to the environment is assumed, this model considers potential release and exposure pathways.

The potential predominant release mechanisms to the environment are (a) resuspension of contaminated particulate matter, (b) volatilization of exposed chemical residuals, and (c) deposition of contaminants to the surrounding soil. Besides release through primary mechanisms, the contaminants introduced into the environment are likely to flow between different environmental media such as air, surface soil, surface water and groundwater due to interconnecting mechanisms such as runoff, deposition, infiltration, etc.

Based on these interconnecting transport mechanisms, potential human exposure mechanisms are: inhalation of volatilized vapors and resuspended particulate matter, and direct contact with contaminated soil or surface water. Groundskeepers, because they are at the site on a regular basis, would have the highest potential for exposure.

The ecological exposure mechanisms are likely to be inhalation of volatilized vapors and resuspended particulate matter, ingestion of contaminated water, ingestion of plants grown using contaminated water, secondary ingestion of aquatic organisms that uptake contaminants through sediments or water, direct contact with contaminated soils or water.

Narrative – RBES Barriers/Interventions
The steps taken to mitigate potential exposures are as follows:

1. The old outfall line and unnecessary wells (recovery, injection, and monitoring) will be grouted to contain contaminants and the new outfall line will be cleaned.
2. Intervention - The FCP site will remain federal government property with limited public access for educational purposes.

ATTACHMENT A

Variance Report
Fernald Closure Project

ATTACHMENT A
VARIANCE REPORT
FERNALD CLOSURE PROJECT

This report presents the differences between the current agreements end state and the risk-based end state (RBES) Vision for the Fernald Closure Project (FCP). The intent of this report is to communicate the individual Variances and provide management with enough data to evaluate the impact of the variances on current plans.

Table 1 provides a description of each proposed Variance along with the impacts of the Variance, barriers to implementation, and any recommendations that may be helpful in the evaluation of the variance. Two maps are provided to illustrate the variances: Figure 1 depicts the end state based on current agreements and Figure 2 depicts the end state based on RBES.

Table 1. Summary of FCP site variances.

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
V-1	**On-Site Disposal Facility:** a) The OSDF was designed for a specific capacity and Waste Acceptance Criteria (WAC) that are applicable to the entire facility. Current practice is to accept only materials that are below the WAC without any consideration being given to average WAC resulting from mixing. Without the consideration of mixing/ blending/averaging in calculating WAC, the OSDF is being underutilized and off-site shipment of material is greater than necessary. The RBES will change these practices to allow application of the OSDF WAC by averaging, which was the original intention and technical basis of the WAC. Additional changes in the application of the WAC would involve disposal of the Silos 1 & 2 debris in the OSDF and all other soils below WAC Resource Conservation and Recovery Act (RCRA) levels. b) OSDF leachate, at a rate of approximately 1 gallon/min (gpm), will be discharged to surface water bodies in the	**Scope**: a) There would no longer be a requirement to reject all material that exceeds the WAC. Most of the above WAC (AWAC) soil currently requiring shipment off-property could be disposed of in the OSDF. Baseline estimates show approximately 30,000 cubic yards of AWAC soil remaining to be excavated. **Cost**: a) The remaining 30,000 cubic yards of AWAC soil is estimated to cost approximately $12 million for excavation and off-site disposal. Disposal in the OSDF is estimated to cost approximately $900,000, resulting in a net cost savings of more than $11 million. On-property disposal costs are approximately $30 per cubic yard compared to off-property disposal costs at approximately $400 per cubic yard. b) Surface water disposal of the leachate will eliminate the need for treatment in the Advanced Wastewater Treatment (AWWT) Facility or by passive treatment. The cost savings would occur in the post-closure	The OU5 Record of Decision (ROD) Response to Comment (RTC) document includes the good faith commitment that the WAC will be a "not-to-exceed" limit. The WAC "not-to-exceed" commitment is not contained in the ROD itself. At a minimum, clarification with Stakeholders and Regulators will be required to implement the change. The approved WAC Attainment Plan also contains the agreement that only soil that is below WAC can be disposed of the in OSDF (i.e., the WAC is a "not-to-exceed" limit). Agreement with Regulators and an approved revision to the WAC Attainment Plan is required to implement the new approach. A revision to the WAC Attainment Plan needs to be negotiated to allow for the disposal of the Silos 1 & 2 debris and the below WAC RCRA Soil. The OSDF Post Closure Care and Inspection Plan requires the treatment of leachate prior to discharge. Requirements related to leachate treatment are being transferred to Groundwater/ Leak Detection and Leachate Monitoring Plan (G/LD&LMP) that will be revised later in CY2003. The G/LD&LMP will need to be revised	Department of Energy (DOE) at the Field Office or Headquarters level needs to determine if it is appropriate to pursue changing WAC application through negotiation at the Field Office or Headquarters level. Currently, it does not appear that there will be support for changing WAC application, working with Agency Representatives at the Site Level. This change represents a large cost savings and is a high priority with the Site Office. **Action**: a) A change in the application of WAC will require clarification of the commitment made in the OU5 ROD RTC document with Stakeholders and Regulators at a minimum. A change in the application of the WAC anytime prior to Closure would have a positive impact on the ability to achieve timely Closure. The earlier the change is negotiated, the greater the benefit to the FCP. b) DOE Ohio Field Office or Headquarters representatives need to discuss the proposed variance to leachate treatment with Stakeholders and Regulators. Decisions

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
	former production area without further treatment, as long as all surface water Final Remediation Levels (FRLs) are met.	period and do not result in a savings to current baseline remediation costs. However, the cost savings during the post-closure period is very significant. **Schedule**: a) Changing the approach to meeting WAC will eliminate some of the risk associated with meeting the 2006 Closure Date. The process for completing soil remediation will be significantly streamlined, but it is difficult to quantify the precise impact to the schedule. **Risk**: a) The OSDF was engineered and constructed to accept waste material that meets the WAC based on cell average concentration. Implementing the RBES Vision will continue to be fully protective of human health and the environment. b) The 1 gpm flow of leachate will not likely impact the overall ability of the surface water to meet FRLs Implementing the RBES Vision will continue to be fully protective of human health and the environment.	to eliminate the requirement for treatment of all leachate, as long as all surface water FRLs are met.	regarding leachate treatment need to be in place by the end of FY04 to allow adequate time for planning and installation of a post-closure treatment system, if required.

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
V-2	**Subsurface Soils/Sediments**: a) The use of sediment FRLs at the FCP is undefined in the OU5 ROD. Current informal agreements with the Agencies have centered on the use of soil FRLs (82 ppm uranium) for streams and ponds. The RBES would apply the sediment FRLs (210 ppm uranium) to streams and ponds and other excavations targeted for future ponds and open water. b) Segregation of clean soil during deep excavation of foundations and subsequent use as fill will decrease the amount of soil sent to the OSDF. Applying the Cross Media Preliminary Remediation Goals (CPRGs) will reduce excavation of subsurface soil that has no surface exposure pathways.	**Scope:** a) Approximately 4 miles of streams and drainage channels exist on the FCP that will remain in their current configuration after remediation. It is estimated that ponds and open water could cover an additional 60 acres of the site by the completion of remediation. It is estimated that the use of the sediment FRL could reduce the amount of soil requiring excavation and disposal by 8,500 cubic yards. **Cost:** a) The use of the sediment FRLs in Paddys Run and the Storm Sewer Outfall Ditch (SSOD) will result in savings of approximately $255,000 in excavation and disposal costs in the OSDF, based on a reduction in 8,500 cubic yards, as discussed above. b) The cost impact of applying the CPRGs is more difficult to quantify. The use of the CPRGs will certainly eliminate the need to dispose of significant quantities of subsurface soil in the OSDF.	a) The OU5 ROD does discuss the use of sediment FRLs, but the exact areas of application are undefined. Informal discussions with the Agencies indicate their position that soil FRLs should be applied to streams and ponds. Agency agreement on the application of the sediment FRL would need to be secured. b) The approved Site-wide Excavation Plan (SEP) currently documents the agreement that all excavated soil is waste. An approved revision to the SEP will need to be secured to allow use of the CPRGs for subsurface soil.	Preliminary discussions have occurred between the DOE Site Office and the Ohio EPA on use of the sediment FRL. To date, there has been some resistance from Ohio EPA to the idea of using sediment FRLs in Paddys Run and site drainage channels. The primary concern is that individuals could access Paddys Run when it is dry and be exposed to concentrations at the sediment FRL that are higher because the inhalation pathway is not included. Controls on the FCP should prevent unauthorized use of Paddys Run and other drainage channels. **Action**: DOE at the Field Office or Headquarters level needs to meet with Regulators and Stakeholders and get concurrence on the proposed variance. a) There is no regulatory documentation that has to be changed to use the sediment FRL as the OU5 ROD discusses the use of Sediment FRLs. b) The use of CPRGs for subsurface soil will require a change in the OU5 ROD and an approved revision of the SEP.

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
		Schedule: The use of the sediment FRLs and the CPRGs will reduce some of the risk associated with meeting the 2006 Closure date. The process of completing soil remediation will be streamlined as result of these changes in the FRL application. **Risk**: a) The soil FRL takes into account the inhalation pathway and is therefore lower than the sediment FRL that assumes no inhalation pathway. The ponds and open water will have permanent water coverage resulting in no change in risk due to use of the sediment FRLs. Paddys Run does dry up in the late summer months, but controls (i.e., fences, signs, barriers) will be in place to keep people from utilizing the streambed in unallowable ways (e.g., motorcycles, ATVs). b) The use of the CPRGs will continue to be fully protective to the Recreational User of the site. Any soil that meets CPRGs will be buried, thus eliminating the exposure pathway to any soil that is above surface soil FRLs.		

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
V-3	**Surface Water/Groundwater**: Current agreement requires treatment of storm water, remediation wastewater, and portions of the groundwater to meet uranium discharge performance based limits to the Great Miami River. The RBES is an increase in the discharge requirement for uranium to the river from 30 parts per billion (ppb) in the outfall line to 530 ppb in the river outside the mixing zone with no mass limit. This variance is required in order to complete decontamination and dismantlement (D&D) of the current treatment facilities, blend untreated storm water prior to 2006, remediation wastewater, and groundwater without treatment prior to discharge and eventually go to monitored natural attenuation (MNA) (predicted to be in 2017) for four remaining on-site areas of groundwater plumes. MNA for groundwater would be implemented once it can be verified that all off-property areas of the aquifer have met the groundwater FRLs.	**Scope**: The current baseline groundwater remedy uses pump and treat technology with groundwater re-injection for the duration of the remedy, which is predicted to achieve cleanup levels in all impacted areas of the aquifer by 2021. The RBES remedy does not include treatment or groundwater re-injection but it does include pumping until 2017, the predicted date when groundwater cleanup levels will be achieved off-property. Monitoring of the on-property areas of groundwater contamination is predicted to be needed until 2068. **Cost**: The cost of the baseline remedy is estimated to be $168 million and the RBES remedy cost is estimated at $83 million. **Schedule**: Groundwater modeling predicts the current groundwater remedy would achieve the cleanup levels by 2021 in all impacted areas of the aquifer (on- and off-property). The MNA remedy is predicted to achieve off-property cleanup by 2017; however, the on-property portion is predicted to persist above the cleanup levels until 2068.	There are three barriers: 1) OU5 ROD and National Pollution Discharge Elimination System (NPDES) permit agreements with Regulators and Stakeholders to treat wastewater, storm water, and groundwater discharged to the river; 2) the need to change the compliance point for aquifer restoration from all points in the impacted areas of the aquifer to the FCP property boundary; and 3) changing the Great Miami River uranium discharge limits from 30 ppb monthly average in the outfall line and 600 pounds annually to 530 ppb outside the river mixing zone and no mass limit.	DOE Ohio Field Office needs to determine if it is appropriate to renegotiate agreement and/or change site baseline documents based on the variance. Any changes would require the action described below. **Action:** Contractor to prepare information package for Regulators and Stakeholders to clarify differences between current baseline and RBES. Package should clearly show that the RBES is fully protective of public or environmental receptors. DOE Ohio Field Office Representatives need to set up meetings with Regulators and Stakeholders to discuss ROD and NPDES permit modifications. ROD and NPDES permit modifications must be obtained by early 2005 in order to meet site closure schedules for disposal of AWWT Facility in the OSDF.

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
		Risk: No change in human health and environmental risk profile. Based on current (September 2003) extraction well uranium concentrations, well field composite uranium concentrations to be discharged to the Great Miami River prior to 2006 will not exceed 100 ppb, which is much less than the 530 ppb discharge requirement (the 10^{-6} risk-based surface water FRL.)		

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
V-4	**Infrastructure**: Current agreements require the removal of both outfall lines, cofferdam, and other structures at the Great Miami River. RBES is to abandon the outfall lines, cofferdam, and other structures in place.	**Scope:** The old outfall line would be grouted and left in place and the new outfall line would be cleaned and left in place. **Cost**: Leaving the infrastructure listed above would eliminate the need to dispose of approximately 32,189 cubic yards of soil and 45,939 cubic yards of debris in the OSDF. The savings associated with the soil would be approximately $227,670 and the savings associated with the debris would be approximately $918,780 for a total savings of approximately $1,146,450. **Schedule**: Leaving the infrastructure listed above would result in approximately 90 days being eliminated from the current baseline schedule in the Soils and Disposal Facility Project. **Risk**: Leaving this infrastructure in place will continue to be fully protective of human health and the environment. The old outfall line is an iron pipe and can be grouted and left in place with no risk of contaminant leaching. The new outfall line is plastic and can be cleaned and left in place without	The OU3 ROD requires the removal of all man-made debris from the site. A clarification or potential change to the ROD will have to be negotiated to leave infrastructure after closure. Leaving the outfall lines in place and the associated Institutional Controls will be a significant issue. The grouting and abandonment plan for the monitoring wells would require compliance with OAC 3701-28-07 and 3745-9-10 governing private and public wells. In some cases, negotiation with individual landowners may be required for off-property wells.	The idea of leaving specific infrastructure (e.g., outfall lines, cofferdam) has not been discussed in detail with Agencies or Stakeholders. DOE at the Site Office level has issued conceptual public use plans for the FCP for public review and comment showing access roads and parking areas. Stakeholders and the Agencies generally supported some form of limited public access and use of the FCP. Discussions regarding monitoring and maintaining the OSDF requiring site access have been discussed in several public forums. The need for access roads and parking lots should not be controversial. **Action**: DOE Ohio Field Office or Headquarters representatives need to meet with Regulators and Stakeholders and get concurrence on the proposed variances. Once Regulator and Stakeholder concurrence is achieved, a clarification or change to the ROD will be required.

ID No.	Description of Variance	Impacts (In Terms of Scope, Cost, Schedule, and Risk)	Barriers to Achieving RBES	Recommendations
		risk of future contamination. Institutional controls to ensure the outfall lines are not excavated or removed will be required during LM.		

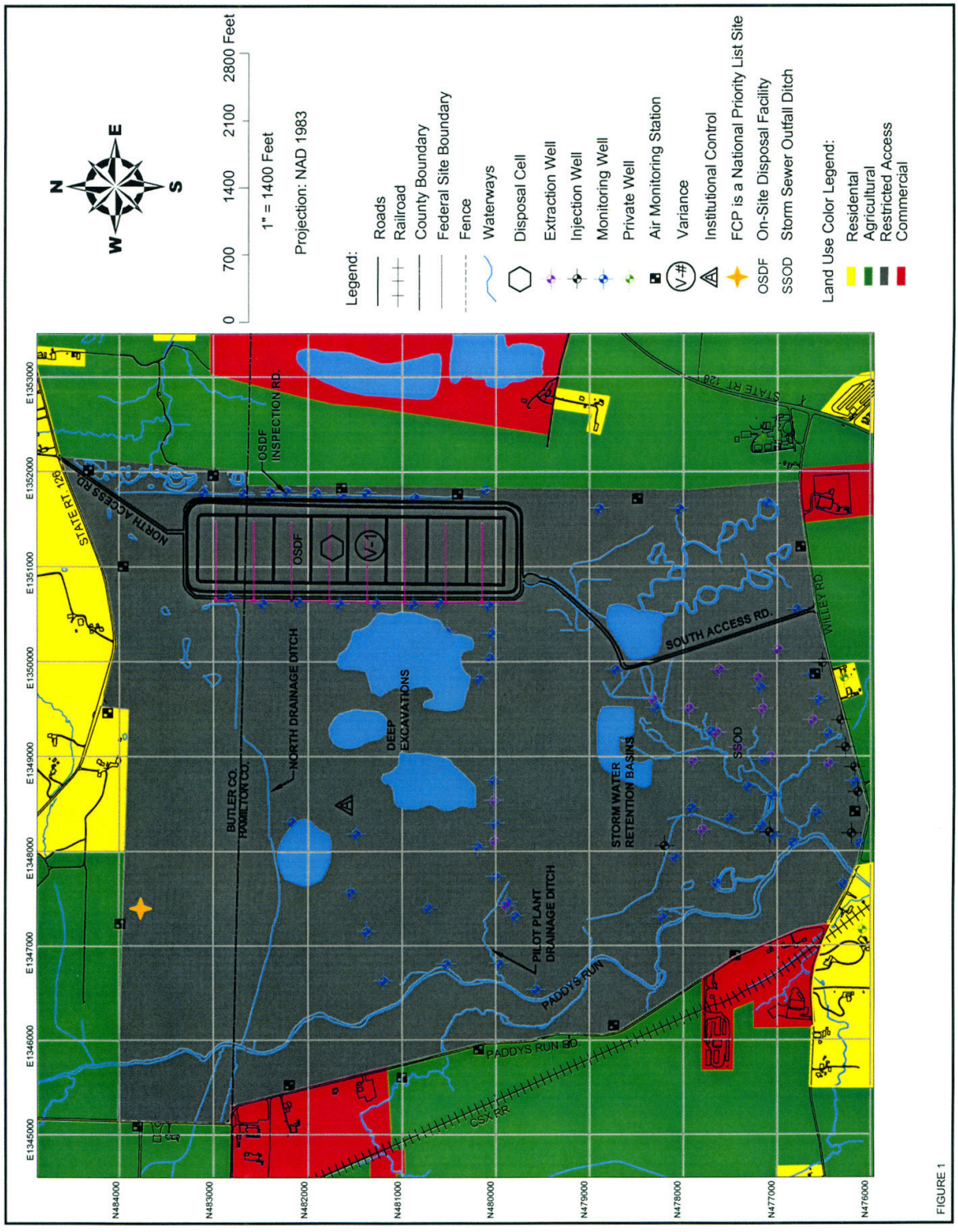


Figure 1. Site wide hazard map – current agreement end state.

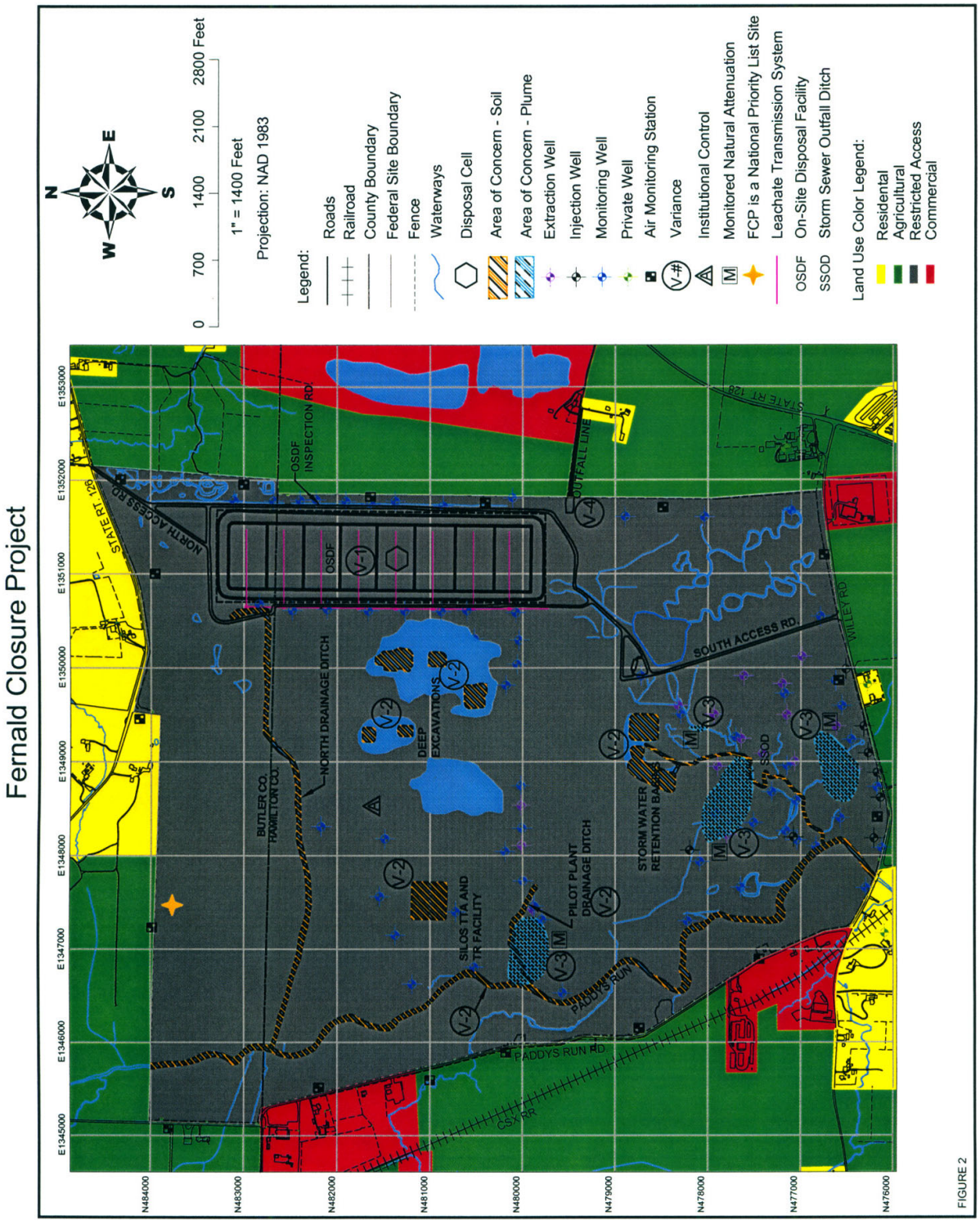


Figure 2. Site wide hazard map – RBES.

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ATTACHMENT B

Fernald RBES Press Articles

ATTACHMENT B

Fernald RBES Press Articles

Congress of the United States

Washington, DC 20515

October 9, 2003

Mr. Bob Warther
Ohio Field Manager
Department of Energy
175 Tri-County Parkway
Springdale, OH 45246

Dear Mr. Warther:

We are writing in regards to published reports indicating that the Department of Energy (DOE) is considering stopping the treatment of uranium contaminated groundwater at Fernald.

As you may know, the *Cincinnati Enquirer* reported the proposed change in its October 4 edition. We were unaware the DOE was contemplating making such a fundamental change to the agreement it signed a decade ago requiring that the aquifer water be treated to drinking water standards.

We strongly believe that in a project as costly, environmentally sensitive, and expansive as the Fernald clean-up – that affects the safety of workers, the health of surrounding communities, and the stewardship of taxpayer dollars – public participation is essential in determining the most prudent approach to closure. We are concerned that DOE bypassed the Fernald Citizen's Advisory Board, the Ohio EPA, and the community's congressional representatives when this proposal was being developed. As Graham Mitchell, chief of OEPA's Office of Federal Facilities Oversight, stated in the *Enquirer*, "It's (DOE's plan) just not consistent with the overall clean-up strategy developed at Fernald over the past 10 years."

We would like to clearly state that we have serious concerns regarding any attempt to alter this agreement. It is our understanding that the current water treatment process is effective, although it would require considerable time and resources to complete, and supported by local stakeholders.

While we appreciate DOE's sensitivities with respect to the cost of the treatment, several important questions need to be answered. Are the proposed changes based on sound scientific studies? What are the other alternatives the DOE is studying to ensure the discharged water is clean? If the DOE were to release contaminated groundwater into the Great Miami, how would that impact the surrounding communities and the

environment?

Please provide us with a response to this report and explain why timely public participation in this very important matter apparently was not sought. As you know, Fernald is on schedule to close in 2006. In recent years, the project's stakeholders cultivated a productive working relationship that was beneficial to everyone. It is unfortunate that the Fernald community learned of this major proposed change to the existing contract from local media. We encourage the DOE to continue to work in good faith with the Fernald stakeholders to complete this important clean-up.

We look forward to your response.

Sincerely,

Steve Chabot
Member of Congress

Rob Portman
Member of Congress

Mike DeWine
United States Senator

George V. Voinovich
United States Senator

cc: Rick Dearborn, Assistant Secretary, DOE Congressional and Intergovernmental Affairs

Fernald clean-up change proposed

Citizens leader promises fight

By Dan Klepal
The Cincinnati Enquirer

CROSBY TWP. – U.S. Department of Energy officials are considering a plan that would allow them to stop treating groundwater contaminated with uranium underneath the former Fernald uranium enrichment plant and, instead, dump it directly into the Great Miami River for more than 19 years, beginning in 2005.

The plan, which would save the federal government about $80 million, would also eliminate the rule that limits to 600 pounds per year the allowable amount of uranium discharged into the river from the site.

Currently, there is a water treatment plant on the Fernald property that treats the tainted groundwater. After being cleaned to drinking water standards, that water is then re-injected into the aquifer so that contaminated groundwater is pushed more quickly toward extraction wells.

But that process is expensive – estimated to cost $168 million before it is finished – and DOE officials recently estimated that the aquifer clean-up will take twice as long as originally thought, possibly lasting until 2021. That led to

See **FERNALD**, Page **A7**

Fernald: Department of Energy wants to dump tainted water

From Page **A1**

the new study, which outlines six cheaper alternatives.

Of those alternatives, the DOE's "preferred option" is to tear down the water treatment facility and stop treating the tainted groundwater altogether, according to documents obtained by the *Enquirer*.

"We realize that some of the alternatives ... are different than what we agreed upon in the past," said Glenn Griffiths, the DOE's acting director at Fernald. "Some of the (discharge) levels in the past were set because we could do it. We have a world-class treatment facility on site. (Those levels) are more conservative than what we now feel we need to consider. The question is: Can we get to the same destination on a different road?"

The DOE's "preferred" road would increase the allowable uranium content in discharges into the river by 1,600 percent per discharge.

But before the new plan could take effect, the DOE would have to seek a change in the legally binding agreement it signed a decade ago that requires the aquifer water to be treated to drinking water standards. That won't be easy, because it appears such an effort would be fought – both by the 14,000 residents who live near the plant and are represented by the Fernald Citizen's Advisory Board, and by the Ohio Environmental Protection Agency.

"Hell no," Lisa Crawford, leader of the Fernald citizen's board, said when asked for her reaction to the proposal. "We're not gonna go there. And if they try to take us there, this community will raise 500 barrels of hell, and then we will sue."

Graham Mitchell, chief of OEPA's Office of Federal Facilities Oversight, said the state's top environmental agency also is against the proposal as it stands. Mitchell pointed out that there is major risk involved with the plan: Namely, there could be additional contamination discovered after the treatment plant is torn down in 2005, thus leaving the DOE incapable of dealing with it.

"It's just not consistent with the overall clean-up strategy developed at Fernald over the past 10 years," Mitchell said. "When we get to the end – and we're nowhere near that – there are a whole bunch of steps that need to occur, and they probably need to occur with a treatment system in place."

"Throwing these major changes in, at this point, does not seem productive."

The DOE's handling of this proposal has upset some. The report outlining the alternatives was produced June 30, but it still has not been shared with the public. A presentation for citizens and regulators is scheduled for Oct. 24.

"Any other time, we would have been handed a draft of the document and been asked our opinion," Crawford said. "They've been sitting on this since June."

Tom Schneider, a Fernald supervisor for the OEPA, agreed.

"The handling of this is completely inconsistent with the successes we've had at Fernald," Schneider said. "Those (successes) have been open processes. In this case, it's something DOE has done behind closed doors. We're getting it at the same time they're going public with it, and they're asking us to buy into it. It's sort of baffling.

"And the issue falls apart before any significant technical discussion even takes place. If you have a treatment technique that's demonstrated to work, you don't just shut that off and decide one day that you don't need to do treatment anymore and start dumping in the river."

Griffiths said the process in deciding how best to treat the aquifer will be a public one. He said the process is just beginning.

"All we're saying is let's talk about it," Griffiths said. "And if those conversations lead us to a point where it doesn't make sense, we won't do it. It's a matter of perspective. We've concluded there could be significant cost savings, and we can still be protective to the environment, so we need to investigate the options.

"We're going to lay (the alternatives) out and say here are, from our perspective, the pros and cons of each and the public debate will take place at that point."

The aquifer cleanup is just one of six major projects on the $4.4 billion, taxpayer-funded Fernald cleanup.

Others include tearing down buildings that were used in extraction of uranium from metal; removing the soil underneath; cleaning waste pits that were used to store radioactive waste; emptying three 50-year-old concrete silos that are housing radioactive waste from the first nuclear experiments; and building a disposal facility that will house low-level waste in perpetuity.

E-mail dklepal@enquirer.com

October 8, 2003
The Cincinnati Enquirer
Editorial page
"Don't compromise cleanup

Fernald Groundwater
Don't compromise cleanup

The idea that the U.S. Department of Energy would even consider unrestricted dumping of uranium-contaminated water from Fernald directly into the Great Miami River is outrageous, even if the cost of cleanup has risen far beyond the original estimates.

Now that it believes cleansing the groundwater at the former uranium enrichment plant could take twice as long as expected – until 2021 or later – DOE is going public with 12 possible alternatives. But the "preferred" option calls for treatment of contaminated groundwater to stop by 2005, then pumped-out water would be dumped directly into the Great Miami River for 19 years. That dubious departure from binding legal agreements signed 10 years ago would free DOE and contractor Fluor Fernald from limits now set at 600 pounds of uranium discharged into the river per year. The plan also calls for dismantling Fernald's advanced water treatment plant.

A warning sign on a truck at the Fernald cleanup site.

The new plan shifts the contamination problem from the Fernald site to the river. It cuts cost by substituting river dilution for water treatment.

Ohio EPA and Fernald's 14,000 neighbors are rightly incensed at this proposed change in long-standing cleanup strategy. If DOE tries to dump the agreement and dump much more tainted water into the Great Miami, Lisa Crawford, head of Fernald's Citizen's Advisory Board, warns, "this community will raise 500 barrels of hell, and then we will sue."

U.S. EPA should exercise rigorous oversight to make sure the existing agreements are not sacrificed to cost concerns or political timetables and that no switch to alternatives is made until the effects on the river, fish and public health are fully studied. Dismantling Fernald's water treatment plant before groundwater cleanup is anywhere near done seems such a patently bad idea it must be suspected of being used as a bargaining chip that DOE could give up in any compromise deal.

It's been estimated Fernald groundwater remediation will cost at least $168 million, and that is just one of six major projects in the $4.4 billion cleanup. Congress faces many other sites with similar, costly cleanups. DOE estimates the alternative aquifer cleanup plan for Fernald could save as much as $80 million. The current method of pumping out tainted groundwater, treating it to remove uranium, then reinjecting it back into the aquifer is slow, expensive work. But nobody ever promised weapons plant cleanups would be quick or cheap. Congress should stay the course.

The history of cleaning up the former weapons plant northeast of Cincinnati has been riddled with unexpected setbacks. Even if all the necessary sign-offs could be obtained to change the agreements, critics warn that an alternative plan could hit unexpected complications during cleanup or even afterward. Cleanup of waste pits and silos can never be perfect. The aquifer could be recontaminated. That's one reason the cleanup contractor is obligated to follow up years after cleanup ends to see if the parts per billion uranium count in Fernald groundwater has rebounded. If so, the water treatment plant could still be needed. Proposed alternatives require a full public vetting.

October 10, 2003
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"Ohioans in D.C. blast plan for Fernald water"

Ohioans in D.C. blast plan for Fernald water

By Dan Klepal
The Cincinnati Enquirer

Ohio congressmen sent a letter to the Department of Energy's top official involved in the Fernald nuclear cleanup, criticizing the agency for a plan that would allow it to stop treating contaminated groundwater next year. Instead, it would be dumped directly into the Great Miami River.

Reps. Steve Chabot of Cincinnati and Rob Portman of Terrace Park, along with Sens. Pat DeWine and George Voinovich, all Republicans, say in the letter they were unaware of the proposed change until reading of it in the *Enquirer* Oct. 4.

The letter is also critical of the DOE for keeping the idea secret for more than three months. The DOE's project manager, Fluor Fernald, completed the proposal June 30. A public hearing is scheduled Oct. 21.

"We strongly believe that in a project as costly, environmentally sensitive, and expansive as the Fernald clean-up – that affects the safety of workers, the health of surrounding communities and the stewardship of taxpayer dollars – public participation is essential in determining the most prudent approach to closure," the letter says.

"We would like to clearly state that we have serious concerns regarding any attempt to alter this agreement," the letter says.

DOE Ohio Field Manager Bob Warther, to whom the letter was addressed, was not in the office Thursday and had not seen the letter, according to spokesman Gary Stegner.

"Until we review the letter, we can't say anything," Stegner said.

The Great Miami Aquifer was contaminated by decades of radioactive waste being dumped in open fields at Fernald. Rainwashed that waste into Paddy's Run creek, which drains into the aquifer and directly into the underground lake.

Fluor Fernald, the company handling the $4.4 billion, taxpayer funded clean-up, prepared a report that outlines six alternatives to cleaning the groundwater in the treatment plant. Of the six alternatives, the DOE's preferred option is to tear down the treatment plant next year and stop treating the tainted groundwater altogether.

E-mail dklepal@enquirer.com

October 22, 2003
The Cincinnati Enquirer
"No plan 'preferred,' officials say"

No plan 'preferred,' officials say

Proposal to stop treating Fernald water protested

CROSBY TOWNSHIP - Officials with the Department of Energy Tuesday backed off a plan that would allow them to stop treating contaminated groundwater underneath the Fernald nuclear cleanup site, instead dumping it directly into the Great Miami River.

In a public meeting Tuesday to explain seven options for treating the groundwater, residents were angry and peppered officials with questions.

In June, energy officials commissioned a report for treating the groundwater.

A "talking points" document relating to the report said the government's "preferred alternative" is to tear down the treatment facility in 2005, begin dumping the tainted groundwater directly into the river, and remove all limits for the amount of uranium it is allowed to pump into the river from the site.

Currently the site can discharge a maximum of 600 pounds of uranium into the river annually.

Dumping the tainted groundwater would have saved about $85 million, but dumped approximately 8,000 pounds of uranium into the Great Miami.

Glenn Griffiths, the energy department's acting director at Fernald, said the government doesn't really have a preference on how to treat the groundwater.

"That was a poor choice of words," Griffiths said of the term "preferred alternative."

"It implies the decision is already made and that efforts have been made to support it," he said. "All the alternatives are exactly equal at this point."

The seven options range from continuing the current treatment method to replacing the treatment plant with a less expensive mobile system or demolishing the on-site plant in 2011 so less uranium would be dumped into the river.

Griffiths said a lengthy public process will precede any decision made on the issue.

That was good news to the approximately 50 residents who came to Tuesday's meeting.

Lisa Crawford, a resident who lives near the plant and is head of the Fernald Residents for Environmental Safety and Health (FRESH), said her organization would sue if the government tries to change the deal now.

"We agreed to what we agreed to," Crawford said. "You can't stop in the middle of the road and just say `We're not going to do this anymore.' "

A 179-acre plume of cancer-causing uranium sits in the groundwater underneath Fernald.

The energy department is required to clean that contamination so that it meets drinking water standards.

Currently, a world-class treatment facility treats that water before it is re-injected into the ground or pumped out to the river.

Pubic comments from the November 18 public meeting on Fernald Risk-Based End State Vision.

- Fernald is too far along in the cleanup process to go through ROD changes
- Didn't we already go through this exercise with the five Records of Decision?
- The RODs already reflect decisions based on risk
- We currently have legal binding agreements. I am angry as a community person that you are asking us to undo what has already been done
- We have negotiated and compromised as far as we are going to go
- Looks like you want permission for us to change our minds and the answer is "No"
- If DOE wants to revisit the end state, then let's look at the big picture and take out the On-Site Disposal Facility and remove soil from surrounding properties, etc.
- The Records of Decision represent social contracts with the community after we looked at every aspect of the cleanup. By the end of the decision –making all parties got to a place where they celebrated. However, lately, the social contract has been broken.
- We understand that the Risk-Based End State Vision is an exercise that hopefully won't go anywhere
- You are asking for more compromise without offering anything in return
- It doesn't look as though the savings as a result of this exercise would be significant
- If you mess with the RODs you will open Pandora's Box and divert valuable time and energy

The Fernald Citizens Advisory Board intends to write a letter opposing implementation of Risk-Based End State opportunities as stated in the document. This letter will be finalized at the December 2 meeting.

Fernald Residents for Environmental Safety and Health (FRESH) also intend to submit a letter with a similar sentiment.